



Idaho State Department of Agriculture



Ground Water Program Annual Report

For 2009





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Authors

Gary Bahr
Ground Water Program

Gary.Bahr@agri.idaho.gov

Kathryn Dallas Elliott
Ground Water Program

Kathryn.Dallas@agri.idaho.gov

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Idaho State Department of Agriculture
2270 Old Penitentiary Road
Boise, Idaho 83712
208-332-8500

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Special thanks go to private well owners who have given permission and access to their property to conduct monitoring activities. We greatly appreciate their participation. ISDA monitoring activities involve the testing of privately owned domestic wells. The ISDA Ground Water Program monitoring network would not exist if not for their assistance.

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Finally, we would like to express appreciation to a number of private groups who have participated in educational workshops, conferences, and meetings to help protect overall ground water quality in the state. These groups include the: Idaho Water Users Association, Idaho Crop Producers Association, Far West Agribusiness Association, Idaho Farm Bureau, Syngenta, Amvac, and the Idaho Potato Commission.

Abstract

The Idaho State Department of Agriculture (ISDA) Ground Water Program implements monitoring and protection activities related to agriculture across the state of Idaho. The goal of this program is to evaluate ground water quality in areas that may be impacted by agriculture and determine appropriate measures to prevent future ground water degradation. Evaluation efforts focus on the establishment of adequate ground water monitoring projects in areas susceptible to water quality problems to determine the extent, degree, and sources of contamination in agricultural areas. ISDA then implements educational, voluntary, and regulatory efforts as well as technical assistance to state, federal, local, and private entities to help correct problems that are contributing to ground water quality problems.

In 2009, the ISDA Ground Water Program implemented 21 distinct monitoring projects. Thirteen of these projects were regional projects, two were local nitrate or pesticide projects, four were Pesticide Management Plan related projects, and two were Environmental Protection Agency (EPA) funded, discretionary pesticide monitoring projects. Water quality findings from these 21 active projects indicated a varying degree of impacts to ground water with nitrate being the most common constituent of concern.

Nitrate monitoring from a few of these projects indicate many well locations across the state have significant nitrate impacts with many exceeding the EPA Maximum Contaminant Level (MCL) of 10 milligrams per liter (mg/L). In 2009, 31 wells or 13 percent (%) of 239 regional project wells sampled by the ISDA Ground Water Program, had nitrate concentrations that exceeded the EPA MCL for nitrate of 10mg/L. Six of the seven regional projects sampled for nitrate in 2009 have mean nitrate concentrations above a commonly accepted background level of 2 mg/L, suggesting some anthropogenic impacts. Nitrate testing ceased at the end of June 2009.

Pesticide testing of regional, local, and discretionary type projects resulted in numerous detections in ground water. However, most detections were less than 20% of drinking water or health-based standards. Six wells out of the 107 wells tested for pesticides in 2009, had levels that exceeded 20% of a drinking water or health-based standard, requiring additional response activities. These sites are located in Fremont, Owyhee, Washington (2), Nez Perce, and Idaho Counties.

ISDA Ground Water Program staff participated, initiated, or provided technical assistance in many ground water protection activities. The Ground Water Program facilitated or participated in 11 educational workshops and public outreach meetings across the state.

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Introduction

Scope

The purpose of this document is to report on Idaho State Department of Agriculture (ISDA) Ground Water Program activities regarding monitoring and protection of Idaho ground water in agricultural areas of the state. The report provides a general overview of these activities and a more detailed synopsis of ground water monitoring findings and ground water projects in 2009. Monitoring from prior years and trend analysis over multiple years of monitoring is addressed in other ISDA Ground Water Program reports. These reports can be found on ISDA's website at www.agri.idaho.gov/Categories/Environment/water/gwReports.php.

Monitoring Program

ISDA's ground water quality monitoring effort is multifaceted to provide data and information to ISDA programs and for compliance with other Idaho plans, laws, and rules. ISDA conducts ground water testing activities that fall within distinct categories to fulfill a variety of needs and requirements. The general categories with a brief explanation are listed in the following subsections.

Regional Monitoring

The ISDA regional monitoring projects are located in areas where there is a moderate to high concern that ground water quality is susceptible to degradation from agricultural practices. The sampling design relies on a stratified random sampling framework. To determine new regional monitoring projects, ISDA utilizes data and information from the Idaho Department of Water Resources (IDWR) Statewide Ground Water Monitoring Network and other agency reports. Also, products created from the Ground Water Monitoring Technical Committee have been used to help determine new regional monitoring project locations

The establishment of a coordinated regional ground water quality monitoring effort is important for the overall protection of ground water quality in Idaho. The basis for developing a regional monitoring effort can be found in numerous documents including the: Ground Water Quality Protection Act of 1989, Idaho Ground Water Quality Plan, Agricultural Ground Water Quality Protection Program for Idaho; 2008 Idaho Ground Water Protection Interagency Cooperative Agreement; and the Pesticide Laws, Rules, and Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Cooperative Agreement with the U.S. Environmental Protection Agency (EPA).

Local Monitoring

Local ground water monitoring involves data collection in areas that are less than ten square miles. Local monitoring most effectively addresses determination of sources of contamination. ISDA conducts local monitoring activities related to pesticides and other potential agricultural contaminants, such as nitrate. Local monitoring is often in response to one or more of the following situations: isolated pesticide detections, isolated nitrate detections above the maximum contaminant level (MCL), and enforcement complaints.

Best Management Practice (BMP) Effectiveness Monitoring

BMP effectiveness monitoring is the evaluation phase of the BMP feedback loop. The premise of the feedback loop is that nonpoint source pollution control is achieved through implementation of BMPs and effectiveness evaluation. Integrated BMP systems are used to prevent agrichemicals from leaching beyond the root zone. In areas where there are concerns, BMPs approved by the state will be implemented on the ground on a site specific basis and then evaluated through monitoring. These BMPs will be modified as needed to achieve water quality standards.

Water quality monitoring is performed to evaluate the effectiveness of BMPs in protecting water quality and to demonstrate compliance with nonpoint source water quality standards. One method of evaluation is to compare analytical results from representative ground water quality monitoring locations to the ground water quality criteria. Other techniques that may be used in conjunction with ground water monitoring include soil testing, vacuum lysimetry, and related techniques which can provide additional data for the evaluation of BMPs.

Protection Activities Overview

Ground water quality protection related to agriculture has been a focus in Idaho. The Idaho State Legislature passed the Ground Water Act (1989) and the Ground Water Quality Plan (1992) for overall guidance and protection of ground water. The Agricultural Ground Water Quality Protection Program for Idaho was passed by the Idaho Legislature, and signed by Governor Batt in 1995 and printed in 1996. ISDA is the lead agency in implementing the Agricultural Ground Water Quality Protection Program for Idaho (1996) through the Agricultural Ground Water Coordination Committee which meets quarterly. These plans and efforts are implemented in coordination with the Idaho Agricultural Pollution Abatement Plan (APAP) and various cooperating agencies.

The goal of the Agricultural Ground Water Quality Protection Program for Idaho (1996) is to protect the state's ground water and interconnected surface water from contamination originating from agricultural activities. The purpose of the program is to describe the management approaches to prevent ground water contamination and to respond to the occurrence(s) of such ground water contamination. Some of the objectives of the program are to: identify agricultural sources of ground water contamination, identify and describe the management approaches, identify and describe implementation strategies, and identify roles and responsibilities of agencies involved in the protection of ground water quality.

These potential agricultural contaminant sources and their impacts are, in part, addressed through education, BMPs, and potential regulations. Pollutant sources such as pesticides are currently being addressed through regulations. Nonpoint source issues related to ground water protection, such as general agriculture and fertilizer use, are to be addressed through projects where voluntary BMPs are being implemented. An area of focus is related to aquifers that have been impacted by nitrate. These areas have been designated by the Idaho Department of Environmental Quality (IDEQ) as Nitrate Priority Areas. ISDA is leading the effort with the Idaho Soil Conservation Commission (ISCC), Idaho Soil Conservation Districts (SCDs), and the Natural Resources Conservation Service (NRCS) to develop agricultural implementation projects within the Nitrate Priority Areas. The SCDs and supporting agencies are developing projects through Clean Water Act 319 grants, NRCS programs, DEQ Source Water Protection grants, and ISCC funds. These are cooperative projects where the ISDA, ISCC, and landowners are providing matching funds and support. ISDA is providing BMP effectiveness monitoring.

Regional Ground Water Quality Projects

Site Selection

ISDA regional project locations are based on review of data from a variety of sources including the: IDWR Statewide Ambient Ground Water Program, IDEQ Public Water Supply Database, USGS ground water quality database, ISDA Dairy Ground Water Quality Database, and Farm Bureau ground water testing data. ISDA evaluates these data sources in addition to site recommendations from other agency water quality professionals for new regional project locations. ISDA Ground Water Program staff meet regularly to determine the need for new regional projects and to consider continuation or discontinuation of existing projects based on funding availability. ISDA Ground Water Program staff discusses this information with other state and federal water quality professionals at the Agricultural Ground Water Quality Coordination Committee during quarterly meetings each year. Current regional project locations are situated in areas known to have concerns for nitrate and/or pesticides in ground water.

Design

The sampling design relies on a stratified random sampling framework. To determine the regional strata (aquifers), ISDA utilizes data and information from the IDWR Statewide Ground Water Monitoring Network. Also, products created from the Idaho Ground Water Monitoring Technical Committee have been used recently to determine new ISDA regional strata. Homogenous aquifer areas are delineated and considered strata and then the areas become part of numerous ISDA ground water monitoring projects. Under the stratified random sampling regime, sections are randomly selected and one well is randomly selected per section. The statistical element to be tested is a qualifying well (Table 1). A qualifying well is a well that: has a confirmed well log, has a confirmed owner and location, can be easily accessed, and can be sampled at an outdoor faucet that does not have any filters, surge tanks, chlorination devices, or water softening devices between the well and faucet. A statistical unit is a section of land (Table 1). A statistical population can be obtained within sections that are within the boundaries of each regional ground water strata (Table 1). A statistical frame consists of maps of sections of land within each regional ground water strata (Table 1). A statistical probability analysis then is completed on preexisting water quality data to determine the number of wells needed to be monitored to provide an overall high probability of defining the true water quality of a given strata.

Table 1. Project design: statistical categories and factors.

Statistical Category	Statistical Factor
Element	A qualifying well
Sampling Unit	A section of land
Population	Sections in each of the regional ground water strata
Frame	Detailed map of sections of land in each of the regional ground water strata

Each regional project was designed to be sampled for five years on an annual basis for nutrients, common ions, and pesticides. Many of the projects have been extended beyond the original five-year plan to better understand the conditions and to evaluate trends in nitrate and pesticide concentrations in ground water. Pesticide results from the first year are evaluated to determine the extent of future pesticide monitoring. If there are limited detections the first year, further monitoring for pesticides occurs during the third and fifth sampling years. Subsequent long term monitoring is addressed in the fifth year of each project. Pesticide sampling at those wells that have pesticides detected at greater than 20 percent (%) of a reference point (health-based standard) commonly is continued in the following year and local project activities may be initiated if follow-up testing result warrant increased attention. All projects require a project monitoring plan to be written prior to formal project sampling.

Standard Operating Procedures

For all projects and monitoring activities, ISDA Ground Water Program staff adheres to established Standard Operating Procedures (SOPs) written by ISDA Ground Water Program staff and kept on file at ISDA. These protocols establish set guidelines for monitoring projects, monitoring wells, quality control and assurance, shipping and handling, laboratory requirements, and other protocols essential to quality work. ISDA staff also follows the ISDA Quality Management Plan (QMP), and Quality Assurance Project Plan (QAPP) which meets EPA standards and concurrence.

Current Project Areas

The ISDA Ground Water Program currently has established regional monitoring activities through a total of 17 distinct projects in the state (Figure 1). Fifteen of the 17 regional projects are active. In 2009, 14 of the 15 active projects were monitored. Projects are named relative to their respective regional part of the state and are assigned distinct project numbers for tracking purposes. Regional projects have been started at a variety of times over the last 14 years and thus are in different stages in terms of duration (Table 2). The number of wells sampled per active regional project area range from 20 to 72 with a total of 282 wells sampled in 2009 as part of the overall regional sampling effort (Tables 2 and 3). The Eastern Snake River Plain Project (840) and Rathdrum Prairie Project (820) were not sampled in 2009, due to the determination of good water quality relative to agrichemicals over the initial five years of monitoring. Future testing of these projects will be completed to determine if good water quality is being maintained.

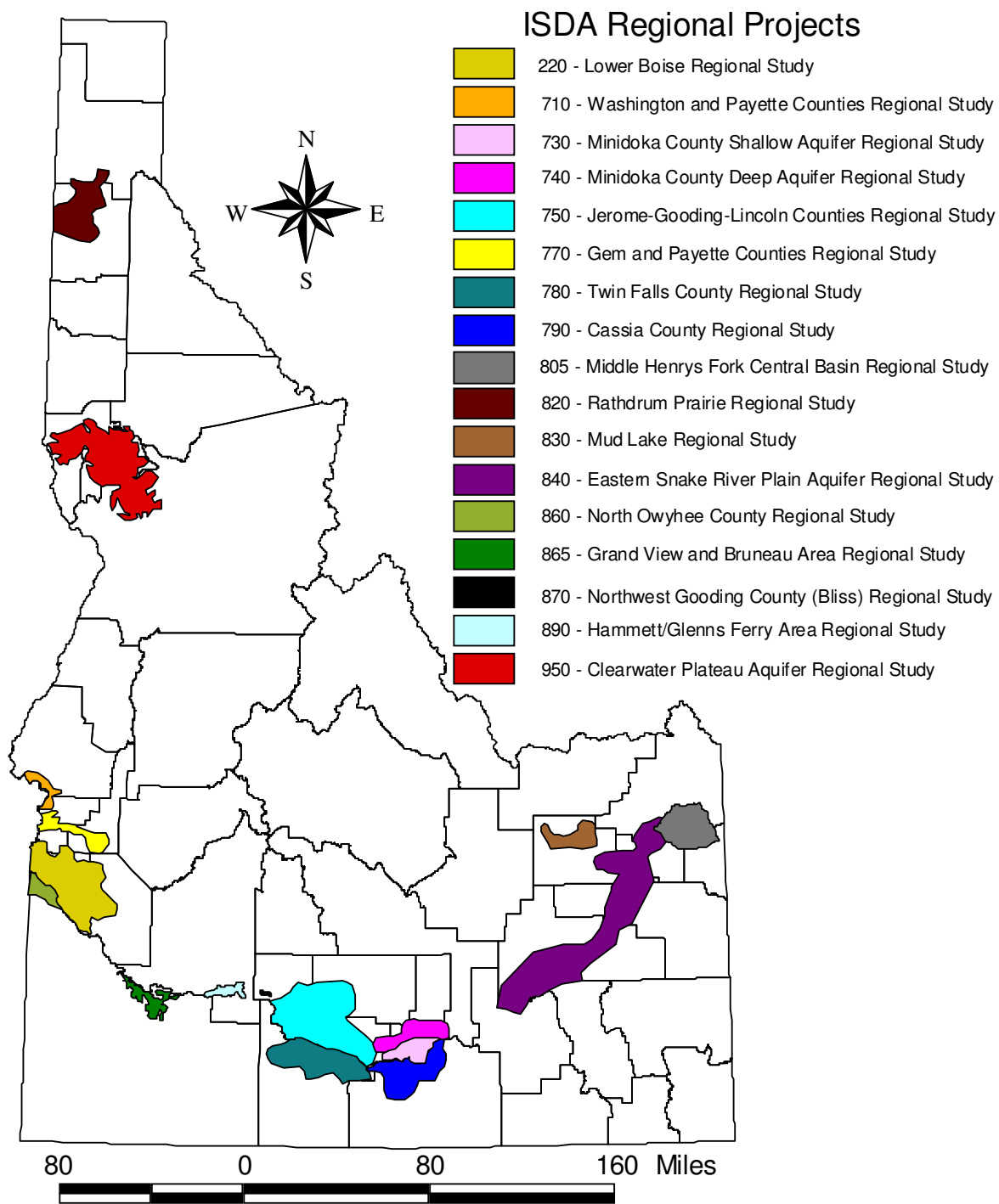


Figure 1. Map of Idaho showing locations of ISDA's 17 regional project areas. Projects 820 and 840 were not sampled in 2009.

Table 2. ISDA Regional Project Monitoring Information for 2009.

Project No.	Project Name	Start Year	Status (2009)	Number (No.) of Wells in Project	No. of Wells Tested for Inorganic Compounds (2009)	No. of Wells Tested for Pesticides (2009)
220	Lower Boise Basin Regional Study	2003	active	64	0	12
710	Washington and Payette Counties Regional Study	1996	active	50	50	10
730	Minidoka County Shallow Aquifer Regional Study	1997	active	43	43	4
740	Minidoka County Deep Aquifer Regional Study	1997	active	48	0	6
750	Jerome-Gooding-Lincoln Counties Regional Study	1997	active	74	0	4
770	Gem and Payette Counties Regional Study	1998	active	44	39	0
780	Twin Falls County Regional Study	1998	active	72	0	14
790	Cassia County Regional Study	1998	active	46	0	8
805	Middle Henrys Fork Central Basin Regional Study	2003	active	48	45	2
820	Rathdrum Prairie Regional Study	1998	inactive	42	0	0
830	Mud Lake Regional Study	1998	active	31	0	5
840	Eastern Snake Plain Aquifer Regional Study	1998	inactive	64	0	0
860	North Owyhee County Regional Study	1999	active	26	24	2
865	Grand View and Bruneau Areas Regional Study	2006	active	25	24	22
870	Northern Gooding County (Bliss) Regional Study	1999	active	17	14	12
890	Hammett/Glenns Ferry Area Regional Study	2008	active	20	0	0
950	Clearwater Plateau Aquifer Regional Study	2001	active	69	0	6

Water Quality Findings

Nitrate

Many of the projects established were developed in response to nitrate problem areas known or believed to exist in the state. As a result, many of the projects have served to better define the extent, possible sources, and overall severity of the problems in terms of median or mean levels, and Maximum Contaminant Level (MCL) exceedances. In addition, many of the projects have been extended well beyond the original five-year plan to better understand the problem and to evaluate trends in nitrate concentrations in ground water. The focus of this annual report addresses only 2009 data and observed statistics and does not present an evaluation of trends. However, numerous ISDA project reports have been written, in part, addressing nitrate trends in Idaho ground water. These reports are available on the ISDA Water Program website at: <http://www.agri.idaho.gov/Categories/Environment/water/gwReports.php>.

Descriptive statistics of ISDA regional projects indicate that many areas in the state have elevated nitrate concentrations in ground water. Numerous wells tested during regional monitoring efforts are found to have nitrate concentrations above the suggested and commonly accepted background nitrate concentration of 2 milligrams per liter (mg/L), suggesting some anthropogenic influences on ground water quality (Neely, 2004). A total of 239 wells in seven regional projects were sampled for nitrate in 2009. Those projects include: Washington and Payette Counties Regional Study (710), Minidoka County Shallow Aquifer Regional Study (730), Payette and Gem Counties Regional Study (770), Middle Henrys Fork Central Basin Regional Study (805), North Owyhee County Regional Study (860), Grand View and Bruneau Areas Regional Study (865), and Northwest Gooding County (Bliss) Regional Study (870). Nitrate testing ceased at the end of June 2009. Six of the seven regional projects monitoring for nitrate in 2009 had mean ground water nitrate concentrations that exceeded the suggested background concentration of 2 mg/L (Table 3). Median ground water nitrate concentrations per project equal or exceed the suggested background level of 2 mg/L in five of the seven active regional projects sampled in 2009 (Table 3). The Grand View and Bruneau Areas Regional Study has the highest mean value of 8.4 mg/L (with a median concentration of 2.6 mg/L), due primarily to a maximum value of 100mg/L, which is the high value recorded within projects sampled in 2009. Wells located in the Washington and Payette Counties Regional Study have the highest median value of 6.1 mg/L (also had the second highest mean of 8.2 mg/L) (Table 3). The remaining projects have mean concentrations ranging from 1.1 mg/L to 5.74 mg/L and median concentrations ranging from 0.03 mg/L to 5.6 mg/L (Table 3).

Sixty wells (25%) out of the 239 wells in the regional network tested for nitrate in 2009, had nitrate concentrations between 5 to 10 mg/L. Thirty one wells (or 13%) exceeded the EPA MCL of 10 mg/L for nitrate (Table 3 and Figure 2). Six of the seven regional projects sampled for nitrate had one or more wells with nitrate levels above the EPA MCL. The North Owyhee County Study was the only regional project with zero wells testing above the EPA MCL for nitrate in 2009 (Table 3). The Washington and Payette Counties Regional Study was the project with the most wells exceeding the MCL for nitrate (36%). The highest single well detection for ground water nitrate (100 mg/L) was recorded from a well west of Grand View in Owyhee County in the Grand View and Bruneau Areas Regional Study.

Table 3. Descriptive Statistics of Nitrate Concentrations in Ground Water from Regional Monitoring in 2009.

Project No.	Project Name	Nitrate Findings (2009)					
		Wells Monitored	Mean (mg/L)	Median (mg/L)	Maximum (mg/L)	Wells from 5 mg/L to 10 mg/L	Wells exceeding the MCL (10 mg/L)
220	Lower Boise Basin Regional Study	0	-	-	-	-	-
710	Washington and Payette Counties Regional Study	50	8.2	6.1	38	13 (26 %)	18 (36%)
730	Minidoka County Shallow Aquifer Regional Study	43	4.4	3.5	25	13 (30%)	2 (4.7%)
740	Minidoka County Deep Aquifer Regional Study	0	-	-	-	-	-
750	Jerome-Gooding-Lincoln Counties Regional Study	0	-	-	-	-	-
770	Gem and Payette Counties Regional Study	39	2.6	1.2	13	5 (12.8%)	3 (7.6%)
780	Twin Falls County Regional Study	0	-	-	-	-	-
790	Cassia County Regional Study	0	-	-	-	-	-
805	Middle Henrys Fork Central Basin Regional Study	45	5.0	4.5	47	16 (35.5%)	2 (4%)
820	Rathdrum Prairie Regional Study	0	-	-	-	-	-
830	Mud Lake Regional Study	0	-	-	-	-	-
840	Eastern Snake Plain Aquifer Regional Study	0	-	-	-	-	-
860	North Owyhee County Regional Study	24	1.1	0.03	9.5	3 (12.5%)	0 (0%)
865	Grand View and Bruneau Area Regional Study	24	8.4	2.6	100	5 (20.8%)	3 (12.5%)
870	Northwest Gooding County (Bliss) Regional Study	14	5.7	4.5	12	5 (35.7%)	3 (21.4%)
890	Hammett/Glenns Ferry Area Regional Study	0	-	-	-	-	-
950	Clearwater Plateau Aquifer Regional Study	0	-	-	-	-	-
All Active Regional Projects Combined		239	5.2	3.2	100	60 (25 %)	31 (13%)

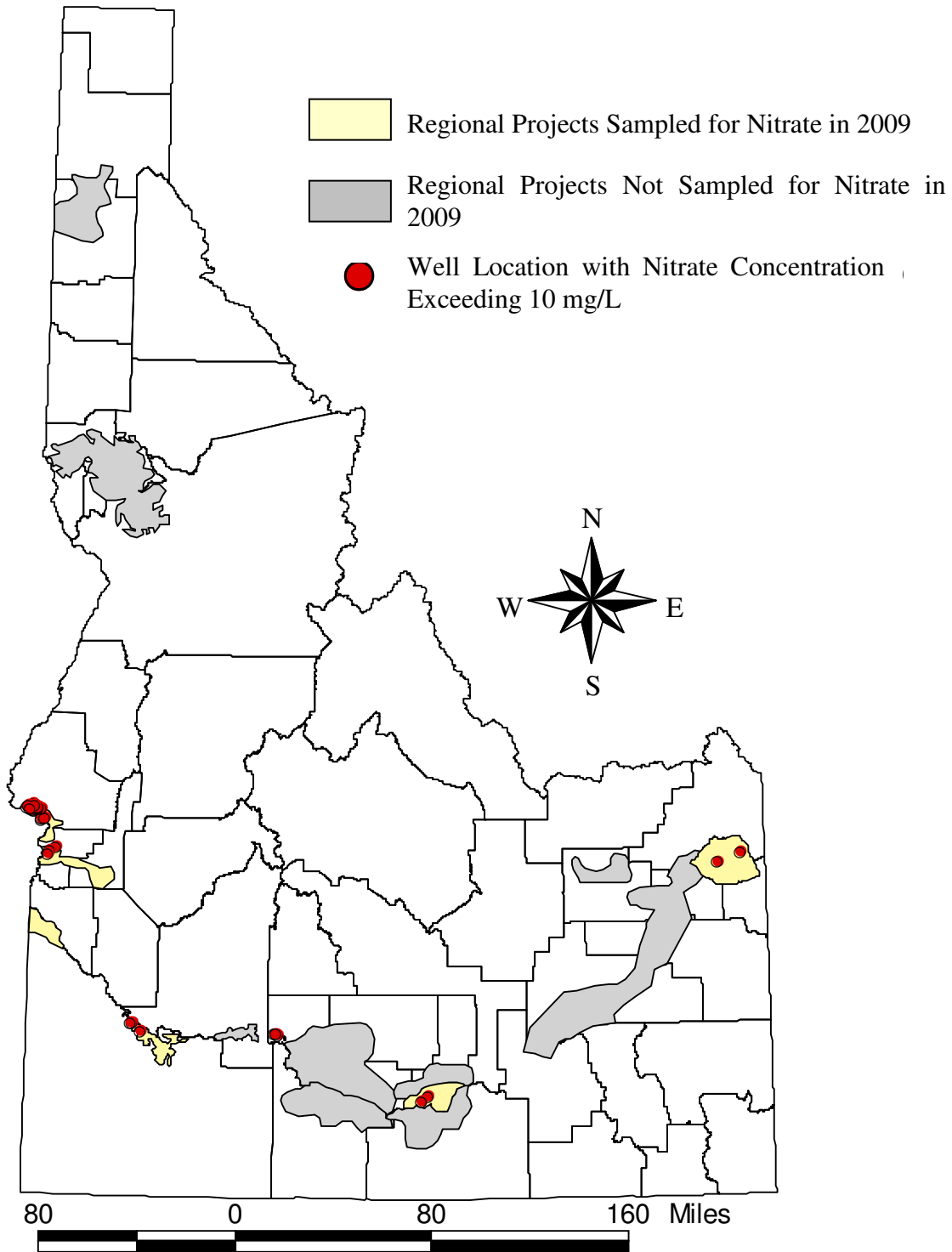


Figure 2. Map showing nitrate detections in ground water from 2009 that exceeded the EPA MCL of 10 mg/L. Detections are from regional monitoring projects only.

Pesticides

A total of 107 wells were tested for various pesticides in 13 regional project areas in 2009 as part of regional monitoring efforts. The 13 regional projects tested for pesticides included: Lower Boise Regional Study (220), Washington and Payette Counties Regional Study (710), Minidoka County Shallow Aquifer Regional Study (730), Minidoka County Deep Aquifer Regional Study (740), Jerome-Gooding-Lincoln Counties Regional Study (750), Twin Falls County Regional Study (780), Cassia County Regional Study (790), Middle Henrys Fork Central Basin Regional Study (805), Mudlake Regional Study (830), North Owyhee County Regional Study (860), Grand View and Bruneau Areas Regional Study (865), Northwest Gooding County (Bliss) Regional Study (870) and the Clearwater Plateau Aquifer Regional Study (950). The pesticide testing involved sampling wells with historic pesticide concentrations. The regional projects tested for pesticides in 2009, the number of wells sampled, and the type of pesticide analysis performed is displayed in Table 4.

Table 4. Summary of 2009 Pesticide Sampling of ISDA Regional Projects.

Project Number and Name	Number of Wells Sampled	Analysis Method (EPA Method Number)
220: Lower Boise Regional Study	12	507, 508, 515.1, 632
710: Washington and Payette Counties Regional Study	10*	507, 508, 515.1, 531.1, 632
730: Minidoka County Shallow Aquifer Regional Study	4	507, 508, 515.1, 632
740: Minidoka County Deep Aquifer Regional Study	6	507, 508, 515.1, 632
750: Jerome-Gooding-Lincoln Counties Regional Study	4	507, 508, 515.1, 632
780: Twin Falls County Regional Study	14	507, 508, 515.1, 632
790: Cassia County Regional Study	8	507, 508, 515.1, 632
805: Middle Henrys Fork Central Basin Regional Study	2	507, 508, 515.1, 632
830: Mudlake Regional Study	5	507, 508, 515.1, 632
860: North Owyhee County Regional Study	2	507, 508, 515.1, 632
865: Grand View and Bruneau Areas Regional Study	22	507, 508, 515.1, 632
870: Northern Gooding County (Bliss) Regional Study	12	507, 508, 515.1, 632
950: Clearwater Plateau Aquifer Regional Study	6	507, 508, 515.1, 632

*Eight wells were sampled for carbamate pesticides only (EPA Method 531.1).

There were 97 positive pesticide detections in 21 wells during the 2009 regional project pesticide sampling; sixteen different types of pesticides were detected (including three metabolites or breakdown products) (Table 5).

Table 5. Summary of Pesticide Detections from ISDA Regional Projects in 2009.

Pesticide	Number of Detections	Range (µg/L)	Mean (µg/L)	Median (µg/L)	Reference Point (µg/L)	County with Detection
2,4-D	1	0.63	---	---	70 (MCL) ¹	Gooding
2,4-DCBA	1	0.48	---	---	91 (RfD) ²	Fremont
Aldicarb Sulfone	2	5.79 (5.64-11.43)	8.54	8.54	7 (HAL)	Washington (2)
Atrazine	24	0.21 (0.03 – 0.24)	0.076	0.06	3 (MCL)	Ada (1) Canyon (3) Cassia (4) Fremont (1) Minidoka (1) Owyhee (7) Twin Falls (5) Washington (2)
Bentazon	1	1.9	---	---	200 (HAL) ³	Owyhee
Bromacil	5	0.54 (0.05 – 0.59)	0.25	0.2	70 (HAL)	Gooding (1) Twin Falls (4)
DCPA (Dacthal)	7	6.63 (0.87 – 7.5)	2.91	2	70 (HAL)	Canyon (3) Gooding (1) Owyhee (2)
Deisopropyl Atrazine	2	0.04 (0.03 – 0.07)	0.05	0.05	....⁴	Minidoka (1) Washington (1)
Desethyl Atrazine	38	0.31 (0.03 - 0.34)	0.11	0.085	....⁴	Ada (2) Canyon (6) Cassia (5) Fremont (1) Jerome (1) Lincoln (1) Minidoka (4) Owyhee (7) Twin Falls (10) Washington (1)
Diuron	4	0.13 (0.03 - 0.16)	0.095	0.095	28 (FQPA DWLOC) ⁵	Cassia (2) Minidoka (2)
Hexazinone	2	0.05 (0.05- 0.1)	0.075	0.075	400 (HAL)	Cassia (2)
Malathion	1	0.09	---	---	100 (HAL)	Ada
Metribuzin	3	0.03 (0.08 – 0.11)	0.093	0.09	200 (HAL)	Fremont (3)
Prometon	2	0.11 (0.08 – 0.19)	0.14	0.14	100 (HAL)	Cassia (1) Minidoka (1)
Simazine	3	0.06 (0.04 – 0.1)	0.08	0.1	4 (MCL)	Cassia (1) Minidoka (2)
Triallate	1	0.49	---	---	0.45 (FQPA DWLOC)	Idaho

¹MCL – EPA Maximum Contaminant Level.²RfD – ISDA PMP Rule Calculated Reference Dose.³HAL – EPA Lifetime Health Advisory.⁴Breakdown product of Atrazine. No reference point available, MCL for Atrazine of 3 µg/L is used.⁵FQPA DWLOC – Food Quality Protection Act Drinking Water Level of Comparison

ISDA regulates pesticide use and handling under Title 22 Chapter 34, Pesticides and Chemigation, Idaho Code. ISDA is the lead agency in developing the Idaho Pesticide Management Plan (PMP) for Ground Water Protection and the Rules Governing Pesticide Management Plans for Ground Water Protection (PMP Rule). ISDA has the authority to implement pesticide programs through a cooperative working agreement with the EPA, Idaho state laws and department rules. The Idaho PMP Rule outlines processes to protect ground water from pesticides and defines pesticide detections based on the concentration of the detection compared to a reference point. The reference point refers to health based concentrations. Idaho has adopted the EPA's MCLs in the Idaho Ground Water Quality Rule (1997). A MCL is defined by EPA as the highest level of a contaminant that is allowed in drinking water and are an enforceable standard (EPA, 2006). Where no MCL exists, the ISDA will use EPA Lifetime Health Advisories (HAL), if they exist. A Health Advisory is defined by EPA as an estimate of acceptable drinking water levels for a chemical substance based on health effects information and is not a legally enforceable standard. The Lifetime Health Advisory (HAL) is the concentration of a chemical in drinking water that is not expected to cause any adverse noncarcinogenic effects for a lifetime of exposure (based on a 70kg-adult consuming 2 liters of water per day) (EPA, 2006). If a HAL does not exist, then an EPA Reference Dose (RfD) number is used. The EPA defines a RfD as an estimate (with uncertainty spanning perhaps an order of magnitude) of daily oral exposure to the human population that is likely to be without an appreciable risk of deleterious effects during a lifetime (EPA, 2006).

Reference points can be found in numerous documents. The reference points used by ISDA to implement the PMP Rule and referred to throughout this document are found in the sources cited in Table 6.

The PMP Rule breaks the pesticide detections into the following detection levels:

Level 1: Detection above the detection limit to less than 20% of the Reference Point.

Level 2: Detection at 20% to less than 50% of the Reference Point.

Level 3: Detection at 50% to less than 100% of the Reference Point.

Level 4: Detection greater than 100% of the Reference Point.

Table 6. Sources for Pesticide Reference Points.

Pesticide	Reference Point (µg/L)	Citation
2,4-D	70 (MCL) ¹	EPA 2006 Edition of the Drinking Water Standards and Health Advisories
2,4-DCBA	91 (RfD) ²	ISDA PMP Rule Calculated Reference Dose
Aldicarb Sulfone	7 (HAL)	EPA 2006 Edition of the Drinking Water Standards and Health Advisories
Atrazine	3 (MCL)	EPA 2006 Edition of the Drinking Water Standards and Health Advisories
Bentazon	200 (HAL) ³	EPA 2006 Edition of the Drinking Water Standards and Health Advisories
Bromacil	70 (HAL)	EPA 2006 Edition of the Drinking Water Standards and Health Advisories
DCPA (Dacthal)	70 (HAL)	EPA 2006 Edition of the Drinking Water Standards and Health Advisories
Deisopropyl Atrazine ⁴	....⁵	.....
Desethyl Atrazine ⁴	... ⁵	.....
Diuron	28 (FQPA DWLOC) ⁶	EPA Reregistration Eligibility Decision for Diuron, 2003
Hexazinone	400 (HAL)	EPA 2006 Edition of the Drinking Water Standards and Health Advisories
Malathion	100 (HAL)	EPA 2006 Edition of the Drinking Water Standards and Health Advisories
Metribuzin	70 (HAL)	EPA 2006 Edition of the Drinking Water Standards and Health Advisories
Prometon	100 (HAL)	EPA 2006 Edition of the Drinking Water Standards and Health Advisories
Simazine	4 (MCL)	EPA 2006 Edition of the Drinking Water Standards and Health Advisories
Triallate	0.45 (FQPA DWLOC)	EPA Reregistration Eligibility Decision for Triallate, 2001

¹MCL – EPA Maximum Contaminant Level.²RfD – ISDA PMP Rule Calculated Reference Dose.³HAL – EPA Lifetime Health Advisory.⁴Breakdown product of Atrazine.⁵No reference point available, MCL for Atrazine of 3 µg/L is used.⁶FQPA DWLOC – Food Quality Protection Act Drinking Water Level of Comparison

2009 Pesticide Monitoring Results by Project

Lower Boise Regional Study

In 2009, 12 wells from the Lower Boise Regional Study (Project 220) were sampled for pesticides (Figure 3). Ten out of the 12 wells sampled for pesticides tested positive for one or more pesticide active ingredient (Figure 3 and Table 7). Four active ingredients or breakdown products were detected in the study area. The herbicide atrazine and one of its breakdown products, desethyl atrazine, were detected most frequently, with detections in four and eight wells, respectively. DCPA, an herbicide active ingredient, was detected in three wells. Malathion, which is an insecticide active ingredient, was detected once. All detections were within the Level 1 category (a detection above the detection limit to less than 20% of the reference point) established by the Idaho PMP Rule and were below any health standards set by the EPA or the state of Idaho.

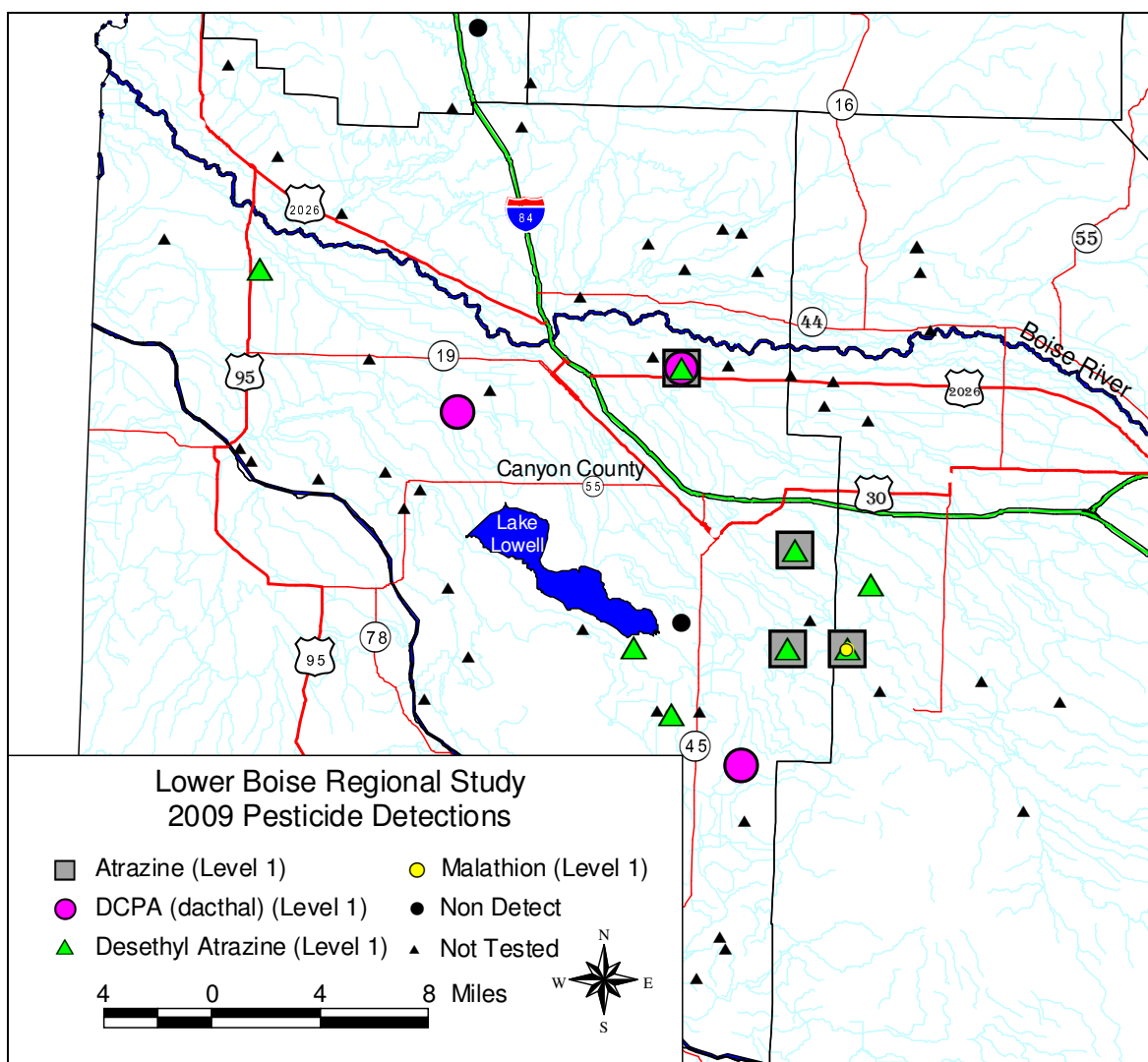


Figure 3. Pesticide results from ISDA 2009 sampling of the Lower Boise Regional Study.

Table 7. Summary of 2009 Pesticide Results from the Lower Boise Regional Study.

Pesticide	No. of Detections (% of wells sampled with detection)	Range (µg/L) (min. – max.)	Reference Point (µg/L)
Atrazine	4 (33%)	0.05 (0.03 – 0.08)	3 (MCL) ¹
DCPA (Dacthal)	3 (25%)	3.63 (0.87 – 4.5)	70 (HAL) ³
Desethyl Atrazine	8 (67%)	0.11 (0.04 – 0.15)	....²
Malathion	1 (8%)	0.09	100 (HAL)

¹MCL – EPA Maximum Contaminant Level.

²Breakdown product of Atrazine. No reference point available, MCL for Atrazine of 3 µg/L is used.

³HAL – EPA Lifetime Health Advisory.

Washington and Payette Counties Regional Study

A total of 10 wells from the Washington and Payette Counties Regional Study (Project 710) were sampled for pesticides in April, 2009 (Figure 4). Eight of the 10 wells sampled for pesticides were tested for carbamate pesticides only (EPA Method 531.1). Four wells had one or more pesticides detected and four different pesticide or breakdown products were detected in the study area (Figure 4 and Table 8). Atrazine and aldicarb sulfone, a breakdown product of the active ingredient aldicarb, were the most commonly detected pesticides, with two detections each. Two breakdown products of atrazine, desethyl atrazine and deisopropyl atrazine were each detected in one well. The two aldicarb sulfone detections in April were elevated; one detection was a Level 3 (between 50% and 100% of the MCL of 7 ppb) and the other detection was a Level 4 (>100% of the MCL). The remaining detections were within the Level 1 category (a detection above the detection limit to less than 20% of the reference point) established by the Idaho PMP Rule and were below any health standards set by the EPA or the state of Idaho.

Due to the two elevated aldicarb sulfone detections in April, follow-up sampling was conducted at those two wells in August, 2009. Split sampling was conducted and three laboratories conducted independent analysis of the samples. The three laboratories included the University of Idaho Analytical Sciences Laboratory (Moscow, ID), the Idaho State Department of Health and Welfare Bureau of Laboratories (Boise, ID), and the Bayer Crop Science Research Park (Stilwell, KS). Results from all three laboratories indicated that the two wells were non detect for all carbamate pesticides, including aldicarb and the breakdown product aldicarb sulfone.

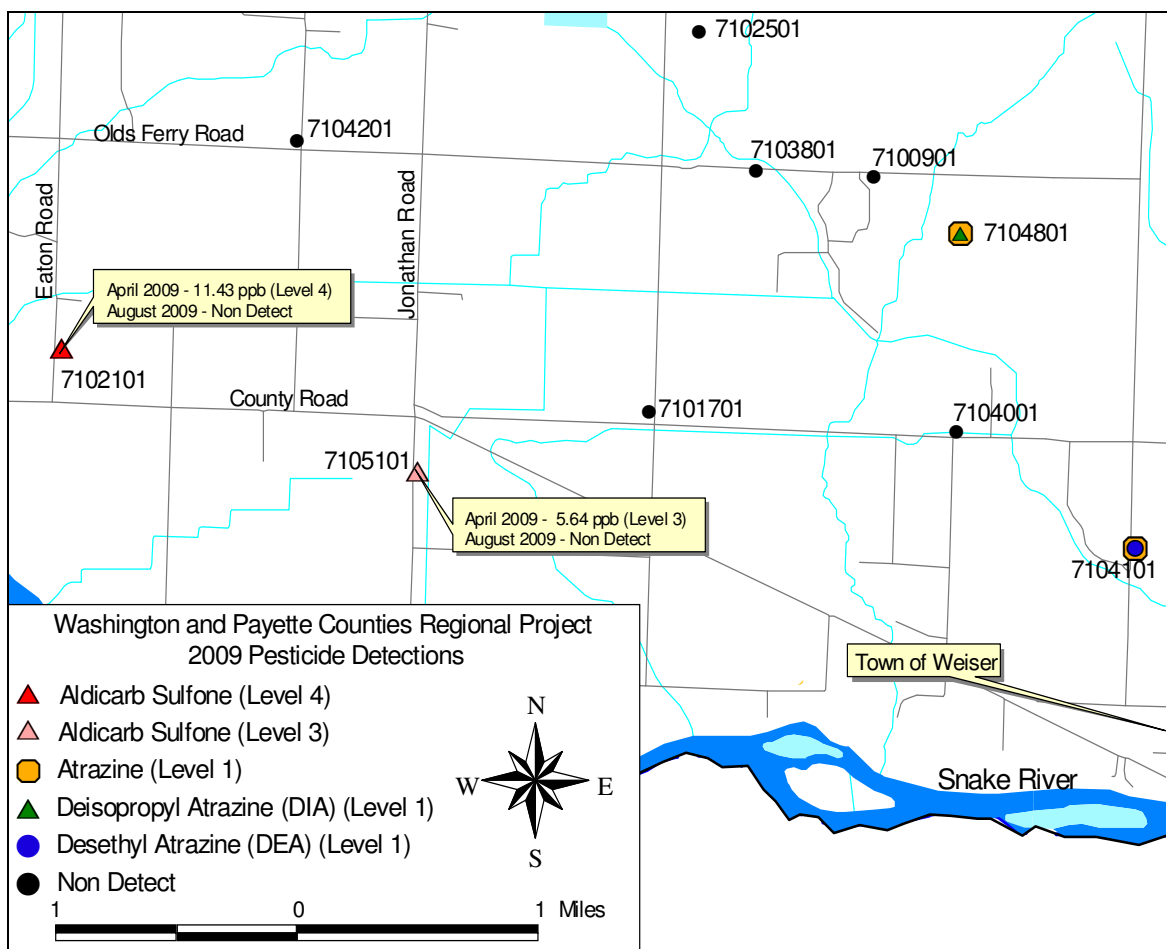


Figure 4. Pesticide results from 2009 sampling of the Washington and Payette Counties Regional Study.

Table 8. Summary of 2009 Pesticide Results from the Washington and Payette Counties Regional Study.

Pesticide	No. of Detections (% of wells sampled with detection)	Range (µg/L) (min. – max.)	Reference Point (µg/L)
Aldicarb Sulfone	2 (20%)	5.79 (5.64 – 11.43)	7 (MCL) ¹
Atrazine	2 (20%)	0 (0.03 - 0.03)	3 (MCL)
Deisopropyl Atrazine	1 (10%)	0.03	....²
Desethyl Atrazine	1 (10%)	0.03	....²

¹MCL – EPA Maximum Contaminant Level.

²Breakdown product of Atrazine. No reference point available, MCL for Atrazine of 3 µg/L is used.

Minidoka County Shallow Aquifer Regional Study

A total of four wells from the Minidoka County Shallow Aquifer Regional Study (Project 730) were sampled for pesticides in 2009 (Figure 5). All four wells had one or more pesticides detected within the ground water (Figure 5 and Table 9). Six different pesticide active ingredients or breakdown products were detected in the study area. The herbicide diuron was the most commonly detected pesticides, with two detections. Atrazine, desethyl atrazine and deisopropyl atrazine (two breakdown products of atrazine), prometon, and simazine were each detected in one well (Figure 5

and Table 9). All detections were within the Level 1 category (a detection above the detection limit to less than 20% of the reference point) established by the Idaho PMP Rule and were below any health standards set by the EPA or the state of Idaho.

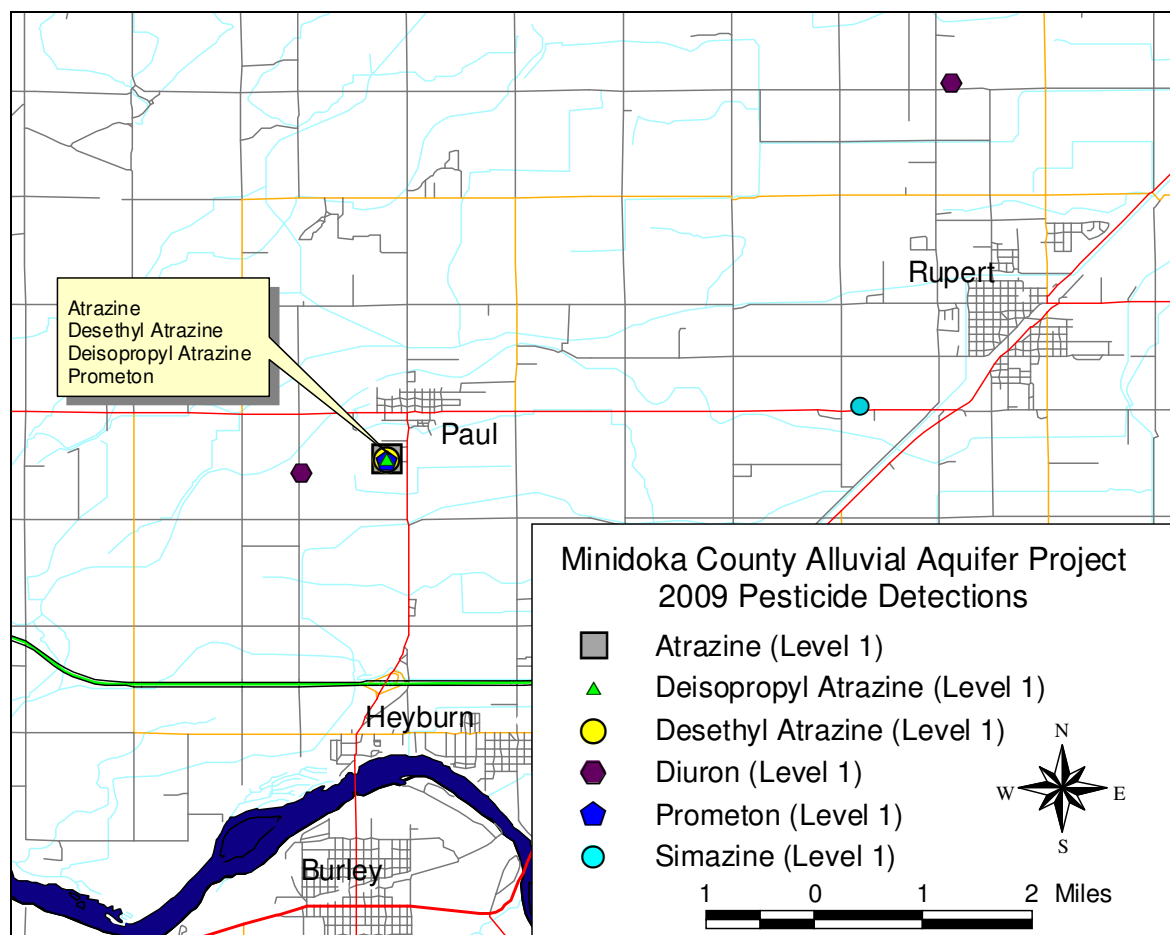


Figure 5. Pesticide results from ISDA 2009 sampling of the Minidoka County Shallow Aquifer Regional Study.

Table 9. Summary of 2009 Pesticide Results from the Minidoka County Shallow Aquifer Regional Study.

Pesticide	No. of Detections (% of wells sampled with detection)	Range (µg/L) (min. – max.)	Reference Point (µg/L)
Atrazine	1 (25%)	0.1	3 (MCL) ¹
Deisopropyl Atrazine	1 (25%)	0.07	....²
Desethyl Atrazine	1 (25%)	0.06	....²
Diuron	2 (50%)	0.07 (0.09 – 0.16)	28 (FQPA DWLOC) ³
Prometon	1 (25%)	0.19	100 (HAL) ⁴
Simazine	1 (25%)	0.1	4 (MCL)

¹MCL – EPA Maximum Contaminant Level.

²Breakdown product of Atrazine. No reference point available, MCL for Atrazine of 3 µg/L is used.

³FQPA DWLOC– Food Quality Protection Act Drinking Water Level of Concern.

⁴HAL – EPA Lifetime Health Advisory

Minidoka County Deep Aquifer Regional Study

A total of six wells from the Minidoka County Deep Aquifer Regional Study (Project 740) were sampled for pesticides in 2009 (Figure 6). Three out of the six wells sampled had one or more pesticide active ingredients or breakdown products detected (Figure 6 and Table 10). Only two pesticides were detected; desethyl atrazine, a breakdown product of the active ingredient atrazine, and simazine. Desethyl atrazine was detected in three wells, while simazine was detected in one well (Figure 6 and Table 10). All detections were within the Level 1 category (a detection above the detection limit to less than 20% of the reference point) established by the Idaho PMP Rule and were below any health standards set by the EPA or the state of Idaho.

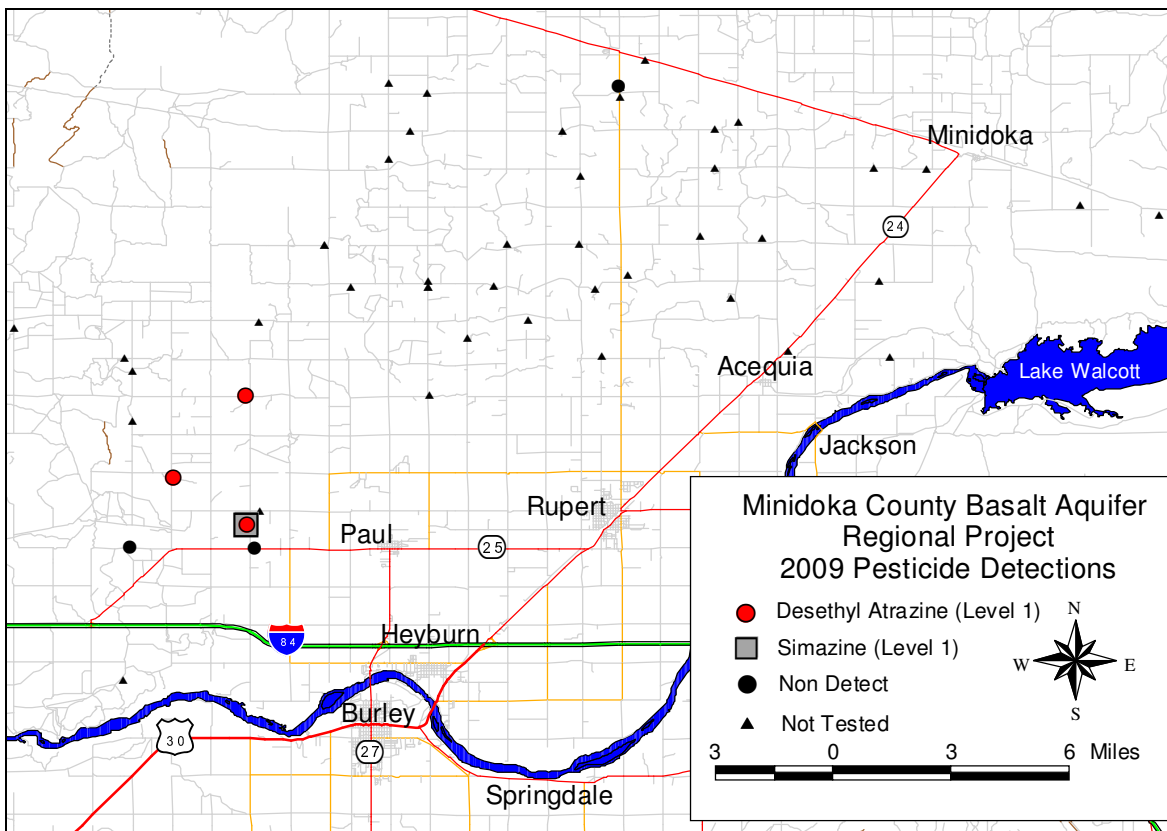


Figure 6. Pesticide results from ISDA 2009 sampling of the Minidoka County Deep Aquifer Regional Study.

Table 10. Summary of 2009 Pesticide Results from the Minidoka County Deep Aquifer Regional Study.

Pesticide	No. of Detections (% of wells sampled with detection)	Range (µg/L) (min. – max.)	Reference Point (µg/L)
Desethyl Atrazine	3 (50%)	0.01 (0.06 – 0.07)	....¹
Simazine	1 (17%)	0.04	4 (MCL) ²

¹Breakdown product of Atrazine. No reference point available, MCL for Atrazine of 3 µg/L is used.

²MCL – EPA Maximum Contaminant Level.

Gooding, Jerome and Lincoln Counties Regional Study

A total of four wells from the Gooding, Jerome and Lincoln Counties Regional Study (Project 750) were sampled for pesticides in 2009 (Figure 7). All four wells had positive detections of one pesticide active ingredient or breakdown product (Figure 7 and Table 11). Two active ingredients, bromacil and DCPA, were each detected once and one breakdown product, desethyl atrazine (a breakdown product of atrazine), was detected in two wells (Figure 7 and Table 11). All detections were within the Level 1 category (a detection above the detection limit to less than 20% of the reference point) established by the Idaho PMP Rule and were below any health standards set by the EPA or the state of Idaho.

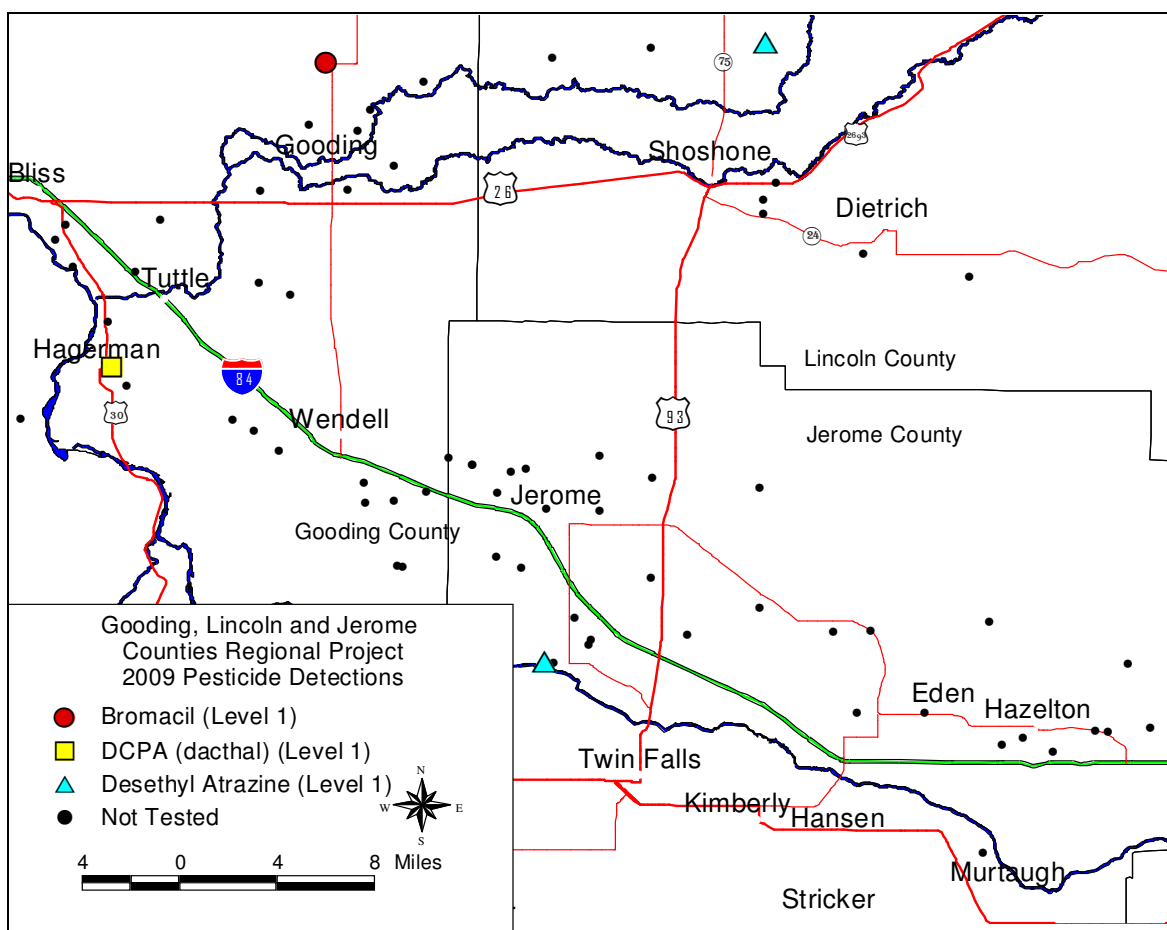


Figure 7. Pesticide results from ISDA 2009 sampling of the Gooding, Lincoln and Jerome Counties Regional Study.

Table 11. 2009 Pesticide Results from the Gooding, Lincoln and Jerome Counties Regional Study.

Pesticide	No. of Detections (% of wells sampled with detection)	Range (µg/L) (min. – max.)	Reference Point (µg/L)
Bromacil	1 (25%)	0.2	90 (HAL) ¹
DCPA (Dacthal)	1 (25%)	1	70 (HAL)
Desethyl Atrazine	2 (50%)	0.01 (0.08 – 0.09)	....²

¹HAL – EPA Lifetime Health Advisory.

²Breakdown product of Atrazine. No reference point available, MCL for Atrazine of 3 µg/L is used.

Twin Falls County Regional Project

A total of 14 wells from the Twin Falls County Regional Study (Project 780) were tested for pesticides as a partial sampling of the project area and follow-up to detections from the monitoring conducted in 2006 (Figure 8). Ten wells had a positive detection of one or more pesticide active ingredient(s) or breakdown product(s) (Figure 8 and Table 12). Three pesticides detected including atrazine, desethyl atrazine (a breakdown product of atrazine) and bromacil. Desethyl atrazine was the most commonly detected with 10 detections (Figure 8 and Table 12). All detections were below any health standards set by the EPA or the state of Idaho and were within the Level 1 category (a detection above the detection limit to less than 20% of the reference point) established by the Idaho PMP Rule.

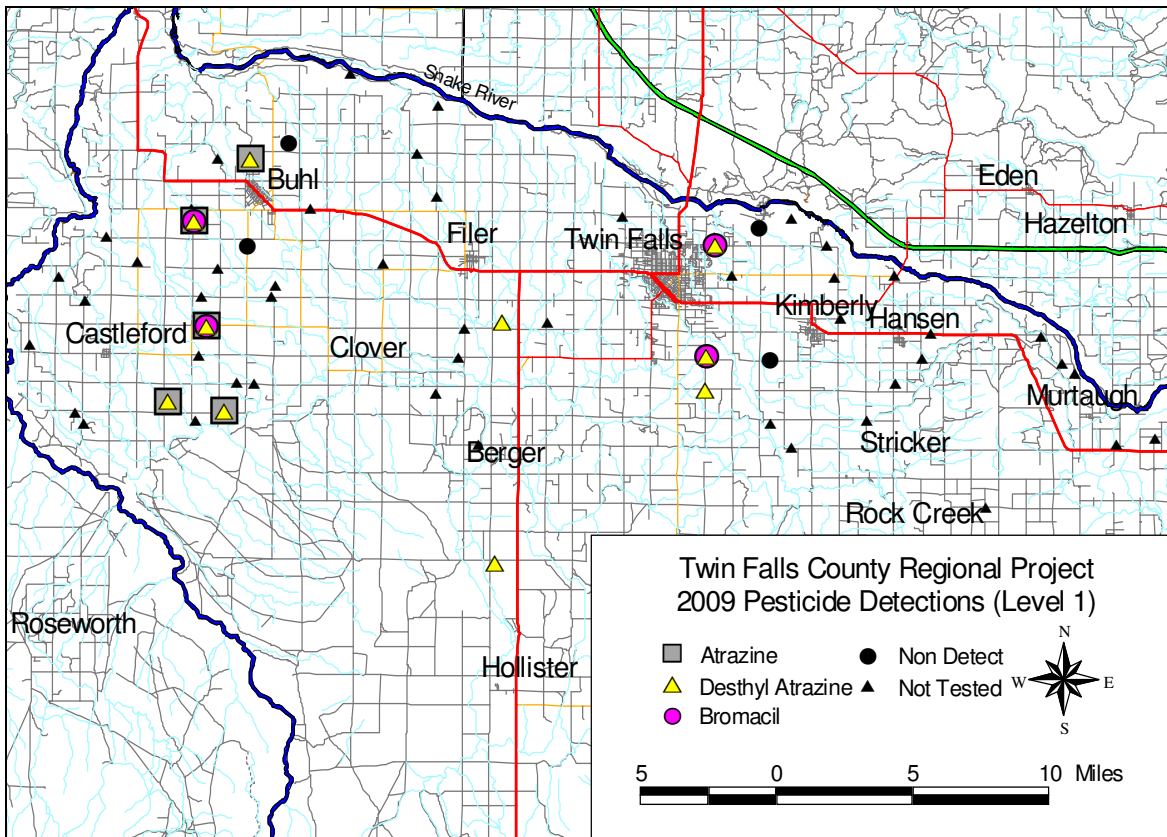


Figure 8. Pesticide results from ISDA 2009 sampling of the Twin Falls County Regional Study.

Table 12. Summary of 2009 Pesticide Results from the Twin Falls County Regional Study.

Pesticide	No. of Detections (% of wells sampled with detection)	Range (µg/L) (min. – max.)	Reference Point (µg/L)
Atrazine	5 (36%)	0.07 (0.03 – 0.1)	3 (MCL) ¹
Desethyl Atrazine	10 (71%)	0.31 (0.03 – 0.34)	....²
Bromacil	4 (28.5%)	0.54 (0.05 – 0.59)	90 (HAL) ³

¹MCL – EPA Maximum Contaminant Level.

²Breakdown product of Atrazine. No reference point available, MCL for Atrazine of 3 µg/L is used.

³HAL– EPA Lifetime Health Advisory.

Cassia County Regional Study

A total of eight wells from the Cassia County Regional Study (Project 790) were tested for pesticides as a partial sampling of the project area and follow-up to detections from the monitoring conducted in 2006 (Figure 9). Seven of the eight wells had a positive detection of one or more pesticide active ingredient or breakdown product (Figure 9 and Table 13). The pesticides detected were atrazine, desethyl atrazine (a breakdown product of atrazine), diuron, hexazinone, prometon, and simazine. Desethyl atrazine and atrazine were the most commonly detected with five and four detections, respectively, followed by diuron and hexazinone with two detections each. Prometon and simazine were each detected once (Figure 9 and Table 13). All detections were below any health standards set by the EPA or the state of Idaho and were within the Level 1 category (a detection above the detection limit to less than 20% of the reference point) established by the Idaho PMP Rule.

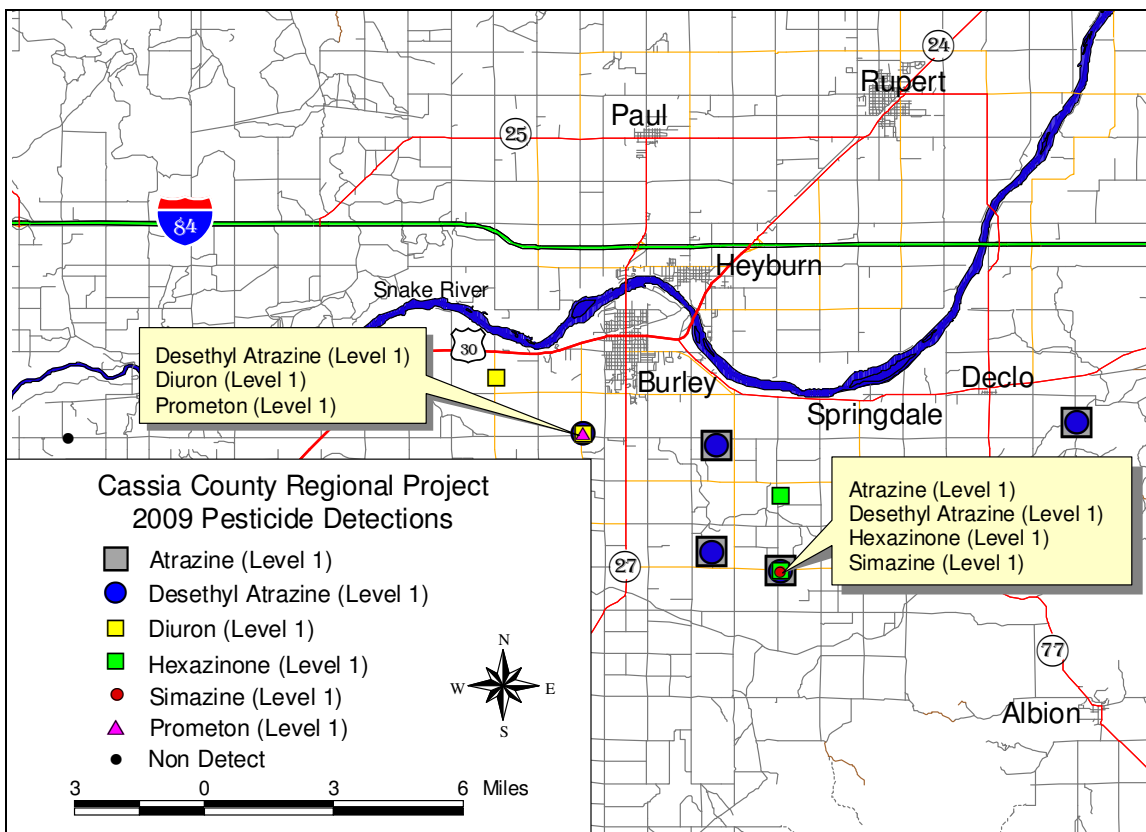


Figure 9. Pesticide results from ISDA 2009 sampling of the Cassia County Regional Study.

Table 13. Summary of 2009 Pesticide Results from the Cassia County Regional Study.

Pesticide	No. of Detections (% of wells sampled with detection)	Range (µg/L) (min. – max.)	Reference Point (µg/L)
Atrazine	4 (50%)	0.04 (0.1 – 0.14)	3 (MCL) ¹
Desethyl Atrazine	5 (62.5%)	0.22 (0.04 – 0.26)	....²
Diuron	2 (25%)	0.07 (0.03 – 0.1)	28 (FQPA DWLOC) ³
Hexazinone	2 (25%)	0.05 (0.05 – 0.1)	400 (HAL) ⁴
Prometon	1 (12.5%)	0.08	100 (HAL)
Simazine	1 (12.5%)	0.1	4 (MCL)

¹MCL – EPA Maximum Contaminant Level.

²Breakdown product of Atrazine. No reference point available, MCL for Atrazine of 3 µg/L is used

³Food Quality Protection Act Drinking Water Level of Comparison.

⁴HAL – EPA Lifetime Health Advisory.

Middle Henrys Fork Central Basin Regional Study

In 2009, two wells from the Middle Henrys Fork Central Basin Regional Study (Project 805) were sampled for pesticide active ingredients (Figure 10). One well had positive detections of both atrazine and its breakdown product, desethyl atrazine; the other well had no positive detections (Figure 10 and Table 14). All detections were below any health standards set by the EPA or the state of Idaho and were within the Level 1 category (a detection above the detection limit to less than 20% of the reference point) established by the Idaho PMP Rule.

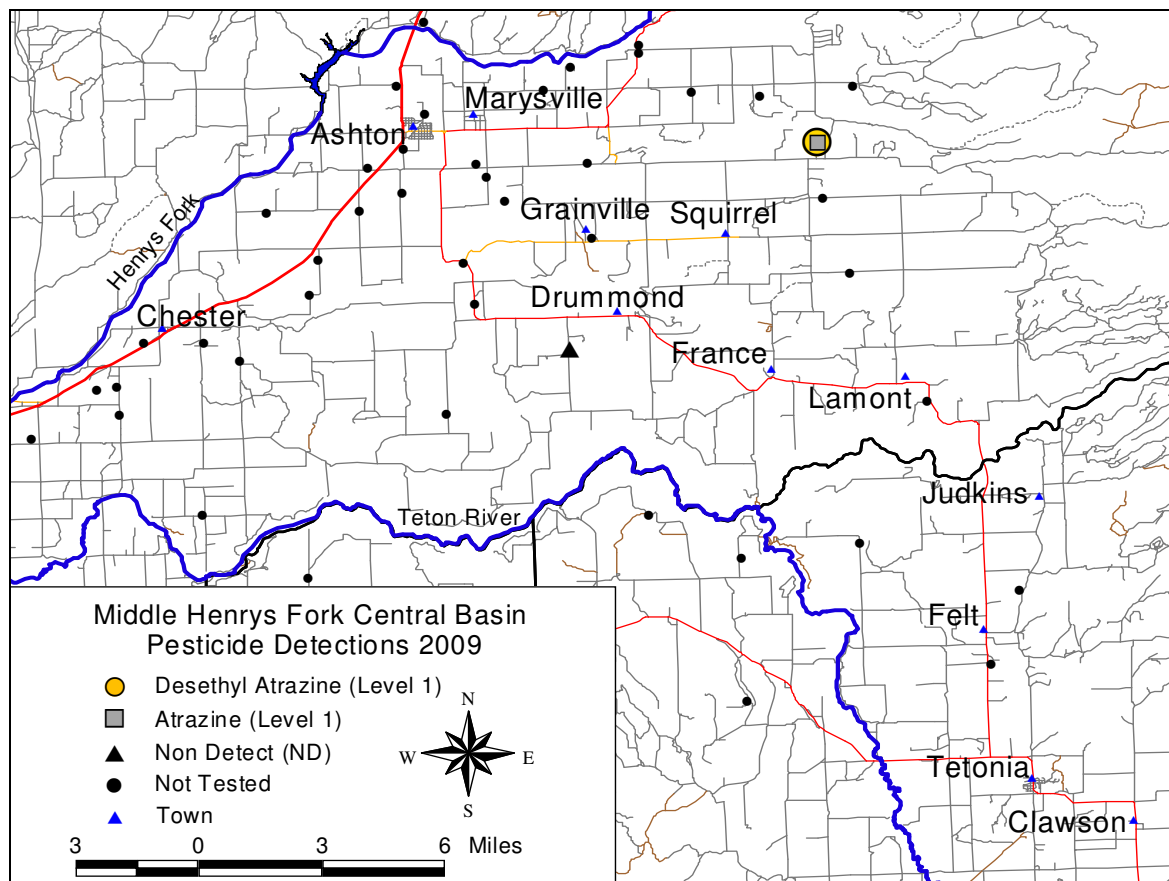


Figure 10. Pesticide results from 2009 sampling of the Middle Henrys Fork Central Basin Regional Study.

Table 14. Summary of 2009 Pesticide Results from the Middle Henrys Fork Central Basin Regional Study.

Pesticide	No. of Detections (% of wells sampled with detection)	Range (µg/L) (min. – max.)	Reference Point (µg/L)
Atrazine	1 (50%)	0.07	3 (MCL) ¹
Desethyl Atrazine	1 (50%)	0.05	....²

¹MCL – EPA Maximum Contaminant Level.

²Breakdown product of Atrazine. No reference point available, MCL for Atrazine of 3 µg/L is used.

Mudlake Regional Study

Five wells from the Mudlake Regional Study (Project 830) were sampled for pesticide active ingredients in 2009 (Figure 11). Four of the five wells had positive detections. Metribuzin was detected in three wells and 2,4-DCBA was detected in one well (Figure 11 and Table 15). All detections were below any health standards set by the EPA or the state of Idaho and were within the Level 1 category (a detection above the detection limit to less than 20% of the reference point) established by the Idaho PMP Rule.

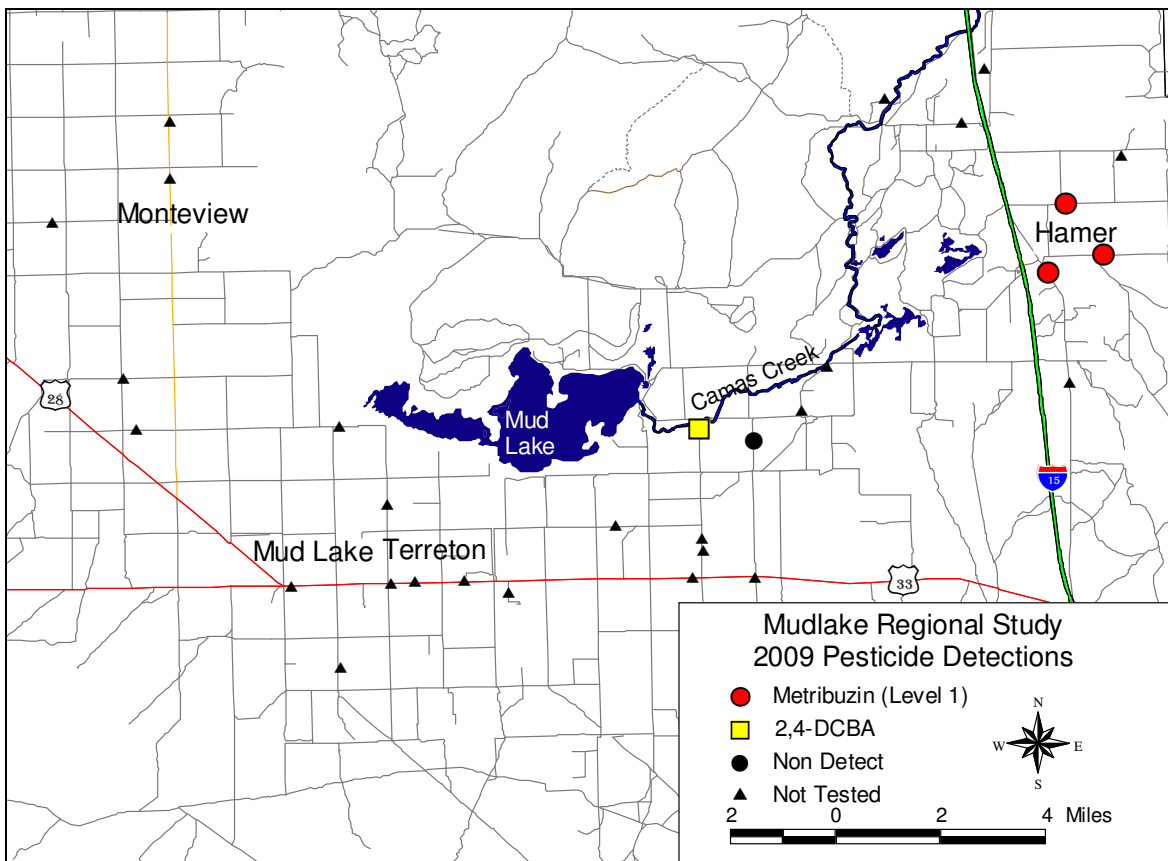


Figure 11. Pesticide results from ISDA 2009 sampling of the Mudlake Regional Study.

Table 15. Summary of 2009 Pesticide Results from the Mudlake Regional Study.

Pesticide	No. of Detections (% of wells sampled with detection)	Range (µg/L) (min. – max.)	Reference Point (µg/L)
2,4-DCBA	1 (20%)	0.48	91 (RfD) ¹
Metribuzin	4 (80%)	0.03 (0.08 – 0.11)	200 (HAL) ²

¹RfD – ISDA PMP Rule Calculated Reference Dose.

²HAL – EPA Lifetime Health Advisory.

North Owyhee County Regional Study

Two wells from the North Owyhee County Regional Study (Project 860) were sampled for pesticides in 2009 (Figure 12). Both wells had positive detections of one or more pesticide active ingredients. Bentazon was detected once and DCPA was detected twice (Figure 12 and Table 16). All detections were below any health standards set by the EPA or the state of Idaho and were within the Level 1 category (a detection above the detection limit to less than 20% of the reference point) established by the Idaho PMP Rule.

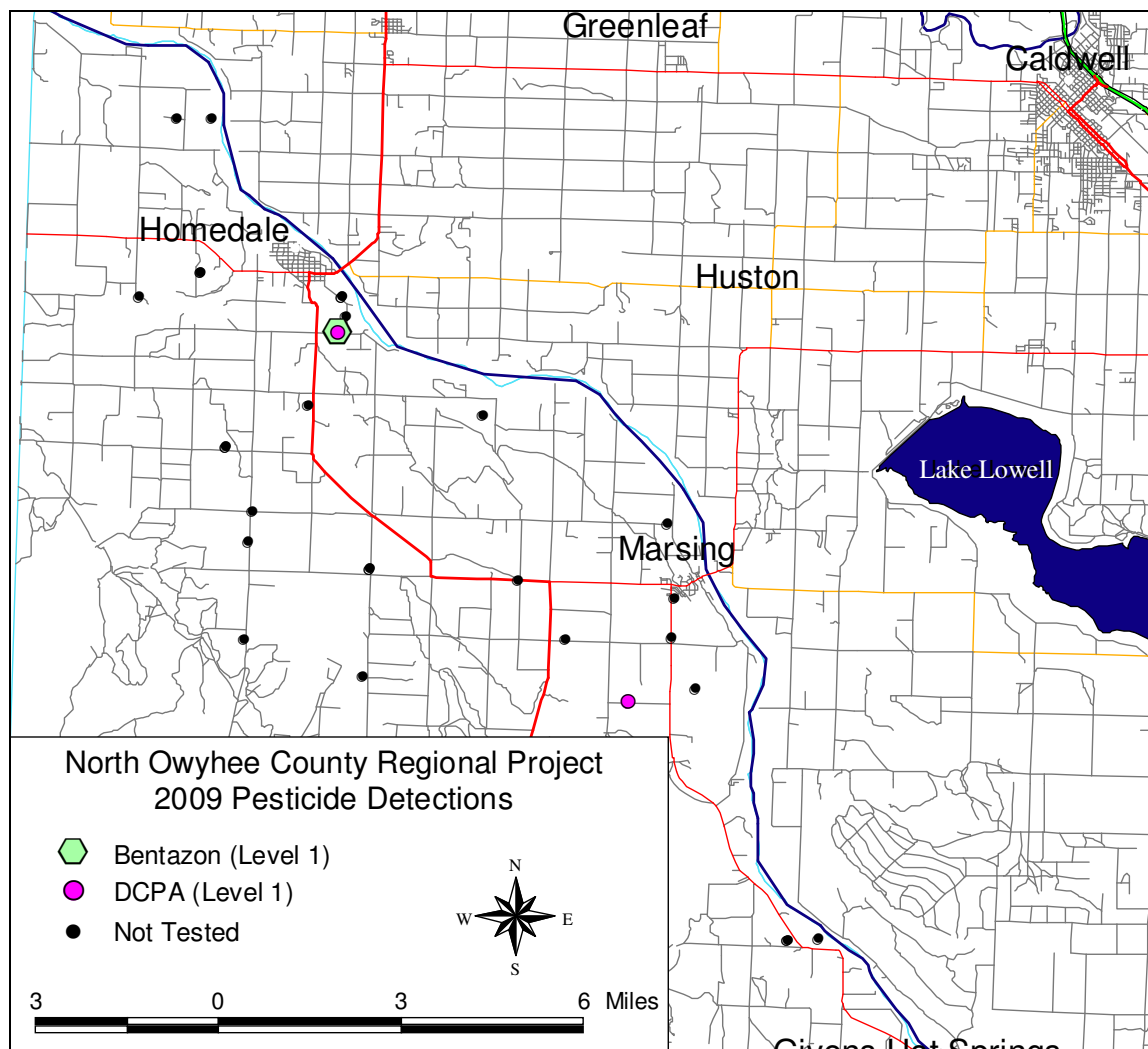


Figure 12. Pesticide results from 2009 sampling of the North Owyhee County Regional Study.

Table 16. Summary of 2009 Pesticide Results from the North Owyhee County Regional Study.

Pesticide	No. of Detections (% of wells sampled with detection)	Range (µg/L) (min. – max.)	Reference Point (µg/L)
Bentazon	1 (50%)	1.9	200 (HAL) ¹
DCPA (Dacthal)	2 (100%)	6.5 (1 – 7.5)	70 (HAL)

¹HAL – EPA Lifetime Health Advisory.

Grand View and Bruneau Areas Regional Study

In 2009, 22 wells from the Grand View and Bruneau Areas Regional Study (Project 865) were sampled for pesticides (Figure 13). Eight out of the 22 wells had positive detections of one or more pesticide active ingredient or breakdown product. Atrazine and desethyl atrazine (a breakdown product of atrazine) were each detected in seven wells; six wells had positive detections of both atrazine and desethyl atrazine (Figure 13 and Table 17). All detections were below any health standards set by the EPA or the state of Idaho and were within the Level 1 category (a detection above the detection limit to less than 20% of the reference point) established by the Idaho PMP Rule.

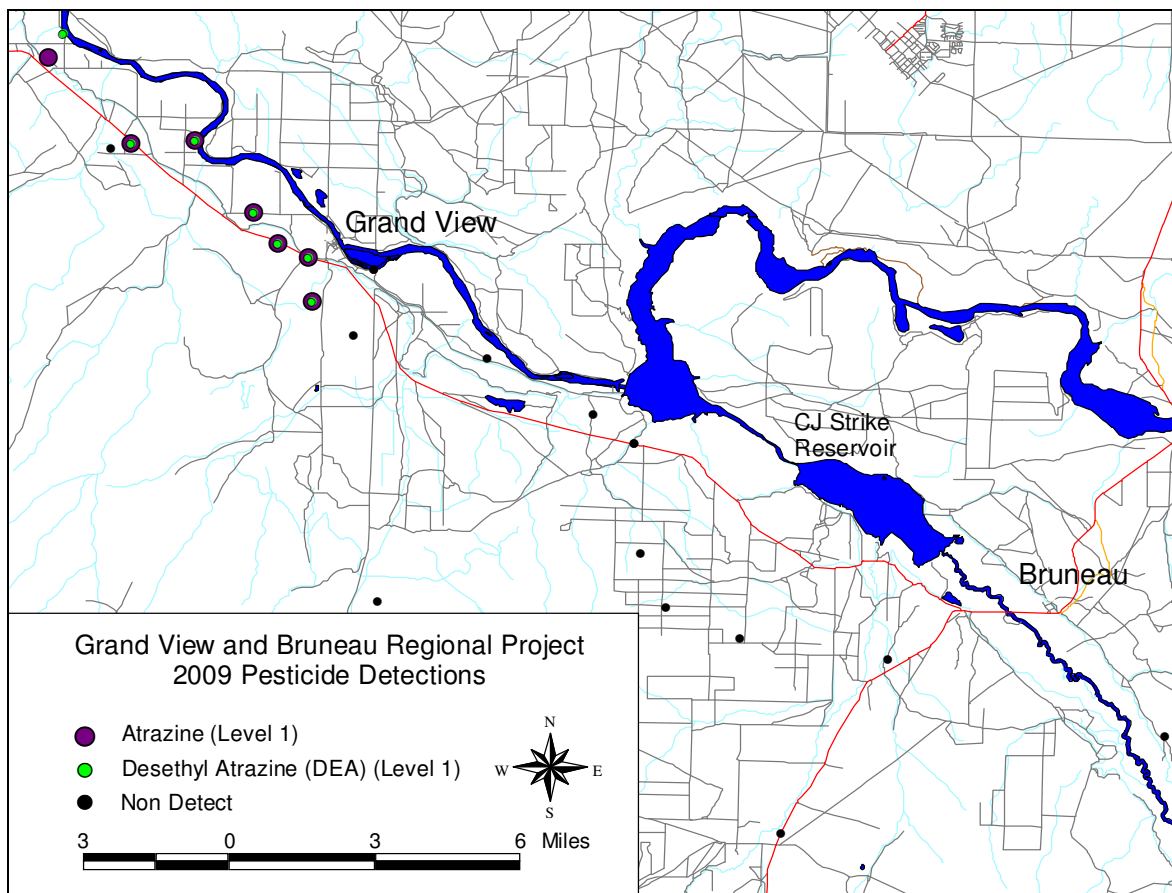


Figure 13. Pesticide results from 2009 sampling of the Grand View and Bruneau Areas Regional Study.

Table 17. Summary of 2009 Pesticide Results from the Grand View and Bruneau Areas Regional Study.

Pesticide	No. of Detections (% of wells sampled with detection)	Range (µg/L) (min. – max.)	Reference Point (µg/L)
Atrazine	7 (32%)	0.21 (0.03 – 0.24)	3 (MCL) ¹
Desethyl Atrazine	7 (32%)	0.29 (0.05 – 0.34)	....²

¹MCL – EPA Maximum Contaminant Level.

²Breakdown product of Atrazine. No reference point available, MCL for Atrazine of 3 µg/L is used.

Northwest Gooding County (Bliss) Regional Study

Twelve wells from the Northwest Gooding County (Bliss) Regional Study (Project 870) were sampled for pesticides in 2009 (Figure 14). Two out of the 12 wells tested had a positive detection of one pesticide active ingredient. The two pesticide active ingredients detected were 2,4-D and DCPA (dacthal) (Figure 14 and Table 18). All detections were below any health standards set by the EPA or the state of Idaho and were within the Level 1 category (a detection above the detection limit to less than 20% of the reference point) established by the Idaho PMP Rule.

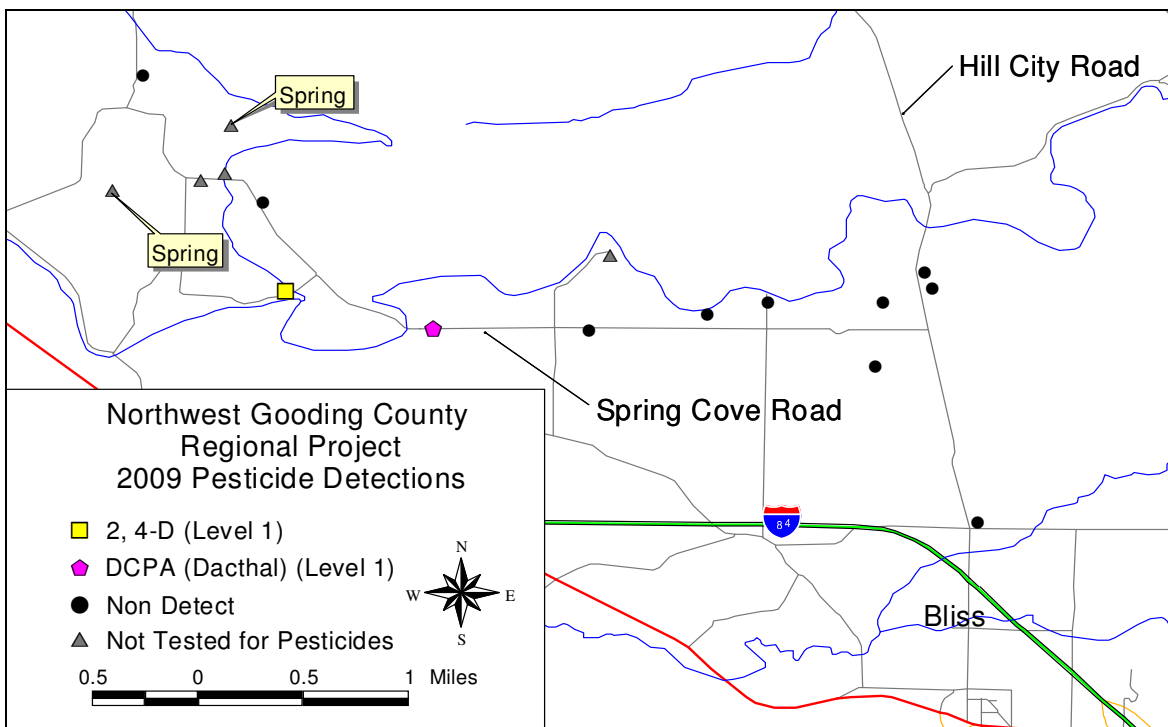


Figure 14. Pesticide results from 2009 sampling of the Northwest Gooding County (Bliss) Regional Study.

Table 18. Summary of 2009 Pesticide Results from the Northwest Gooding County (Bliss) Regional Study.

Pesticide	No. of Detections (% of wells sampled with detection)	Range (µg/L) (min. – max.)	Reference Point (µg/L)
2,4-D	1 (8%)	0.63	70 (MCL) ¹
DCPA (Dacthal)	1 (8%)	0.14 – 2.8	70 (HAL) ²

¹MCL – EPA Maximum Contaminant Level.

²HAL – EPA Lifetime Health Advisory.

Clearwater Plateau Aquifer Regional Study

In 2009, six wells from the Clearwater Plateau Aquifer Regional Study (Project 950) were sampled for pesticides (Figure 15), including a well approximately 2 miles north/northeast of Greencreek, Idaho which, historically has had elevated detections of Triallate. The well near Greencreek, had a Level 4 Triallate detection (a detection that exceeds the Food Quality Protection Act Standard Drinking Water Level of Concern (FQPA DWLOC) of 0.45 µg/L). The remaining five wells did not test positive (non detect) for the compounds included in the analytical screen (Figure 15 and Table 19).

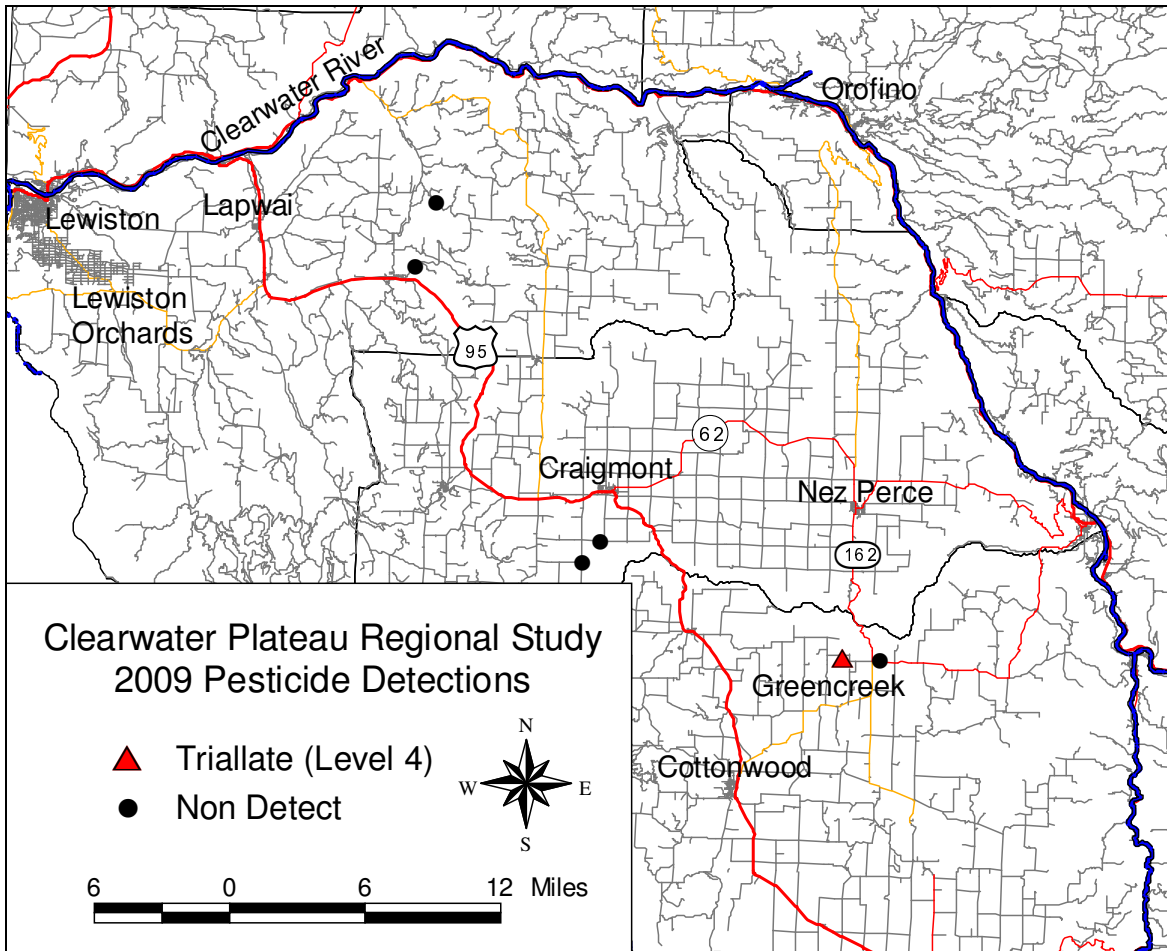


Figure 15. Pesticide results from ISDA 2009 sampling of the Clearwater Plateau Aquifer Regional Study.

Table 19. Summary of 2009 Pesticide Results from the Clearwater Plateau Aquifer Regional Study.

Pesticide	No. of Detections (% of wells sampled with detection)	Range (µg/L) (Min. – Max.)	Reference Point (µg/L)
Triallate	1 (16.7%)	0.82	0.45 (FQPA DWLOC) ¹

¹FQPA DWLOC – Food Quality Protection Act, Drinking Water Level of Concern.

Local Ground Water Quality Projects

Site Selection

ISDA selects local project locations based on review of data from a variety of sources including the: IDWR Statewide Ambient Ground Water Program, IDEQ Public Water Supply Database, USGS ground water quality database, ISDA Dairy Ground Water Quality Database, and Farm Bureau ground water testing data. To develop new projects, ISDA evaluates these data sources and recommendations from other agencies. ISDA Ground Water Program staff meet on a regular basis to determine the need for new local projects as well as to consider continuation or discontinuation of existing projects while also considering available funding. ISDA Ground Water Program staff respond to complaints or concerns regarding potential local agricultural contamination of ground water and conduct onsite initial assessments to determine if future monitoring work is needed. ISDA Ground Water Program staff discusses this information with other state and federal water quality professionals at the Agricultural Ground Water Quality Protection Committee during quarterly meetings each year as well as the IDEQ chaired Ground Water Monitoring Technical Committee.

Design

ISDA Ground Water Program staff relies almost entirely upon sampling of privately owned domestic wells for local projects. Because local projects are typically less than 10 square miles, selection of wells for sampling is generally less stringent than for regional projects. Most wells within the area of concern may be sampled. When wells are abundant, selection is made by taking into account many factors such as well placement, well depth, well log information, and proximity to area of concern. Monitoring wells are installed where deemed needed and funding is available. All projects require a project monitoring plan to be written prior to formal project sampling.

Standard Operating Procedures

For all projects and monitoring activities, ISDA Ground Water Program staff follows established protocols kept on file at ISDA. These protocols establish guidelines for establishing monitoring projects, monitoring wells, quality control and assurance, shipping and handling, laboratory requirements, and other protocols essential to quality work. ISDA staff also follow the ISDA QMP and QAPP which meet EPA standards and concurrence.

Project Areas

In 2009, staff sampled two local monitoring projects that meet the size criterion for a local project. One project is located northwest of Eagle, Idaho (Eagle Local Project) and the other is located

south of Mountain Home, Idaho (Elmore County Project). Both projects were sampled for pesticides only.

Water Quality Findings

Pesticides

Elmore County Local Project

A total of 4 wells were sampled for pesticides in the Elmore County Local Project in 2009. The majority of the wells are located along South 18th East Street and Hamilton Road (Figure 16). All four wells had one or more pesticides detected within the ground water. Six pesticide active ingredient or breakdown products were detected in one or more wells. Bromacil and desethyl atrazine, a breakdown product of the pesticide atrazine, were the most commonly detected with detections in three wells each. Atrazine was detected in two wells; bentazon, norflurazon and metribuzin were each detected once (Figure 16 and Table 20). All detections were below any health standards set by the EPA or the state of Idaho and were within the Level 1 category (a detection above the detection limit to less than 20% of the reference point) established by the Idaho PMP Rule.

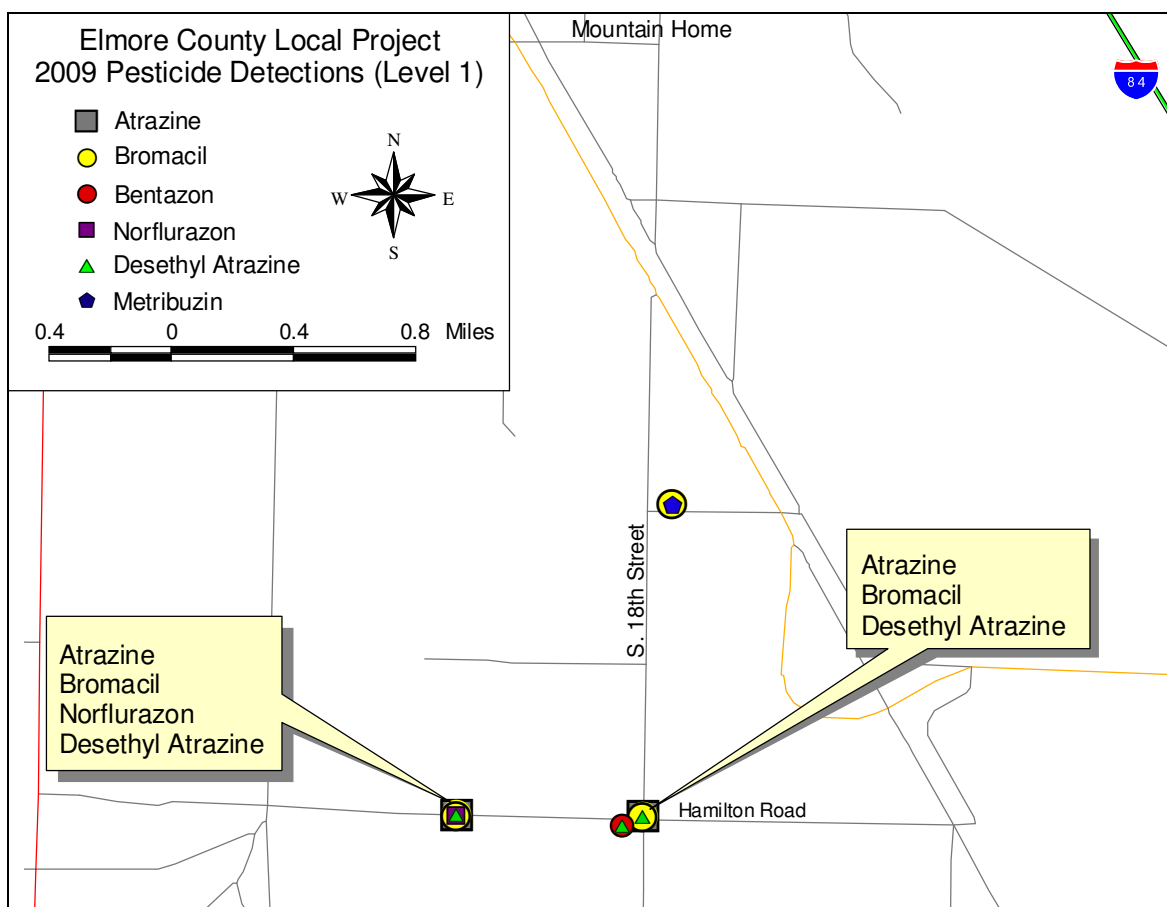


Figure 16. Pesticide results from 2009 sampling of the Elmore County Local Project.

Table 20. Summary of 2009 Pesticide Results from the Elmore County Local Project.

Pesticide	No. of Detections (% of wells sampled with detection)	Range (µg/L) (Min. – Max.)	Reference Point (µg/L)
Atrazine	2 (50%)	0.01 (0.07 – 0.08)	3 (MCL) ¹
Bentazon	1 (25%)	0.47	200 (HAL) ²
Bromacil	3 (75%)	0.7 (0.07 – 0.77)	90 (HAL) ²
Desethyl Atrazine	3 (75%)	0.25 (0.09 – 0.34)	... ³
Metribuzin	1 (25%)	0.06	70 (HAL) ²
Norflurazon	1 (25%)	0.16	30 (HAL) ⁴

¹MCL – EPA Maximum Contaminant Level.

²HAL – EPA Lifetime Health Advisory.

³Breakdown product of Atrazine. No reference point available, MCL for Atrazine of 3 µg/L is used.

⁴HAL – EPA Office of Pesticide Program's estimated Lifetime Health Advisory from the Norflurazon R.E.D (EPA, 1996).

Eagle Local Project

Three wells in the Eagle Local study were sampled for pesticides in 2009 (Figure 17). Two of the three wells (7300601 and 5303701), were also sampled for volatile organic compounds (VOCs), due to historical elevated detections of the VOC 1,2,3-trichloropropane, which is a breakdown product from an old formulation of a soil fumigant. The VOC 1,2,3-trichloropropane was detected in both wells (Figure 17). The EPA Lifetime Health Advisory Level for 1,2,3-trichloropropane is 40 µg/L (Table 21). Metribuzin, DCPA (dacthal) and desethyl atrazine (a breakdown product of atrazine) were detected in all three wells. Bromacil, atrazine, and terbacil were each detected twice. Diuron was detected once (Figure 17 and Table 21). All detections were within the Level 1 category (a detection above the detection limit to less than 20% of the reference point) established by the Idaho PMP Rule and below any health standards set by the EPA.

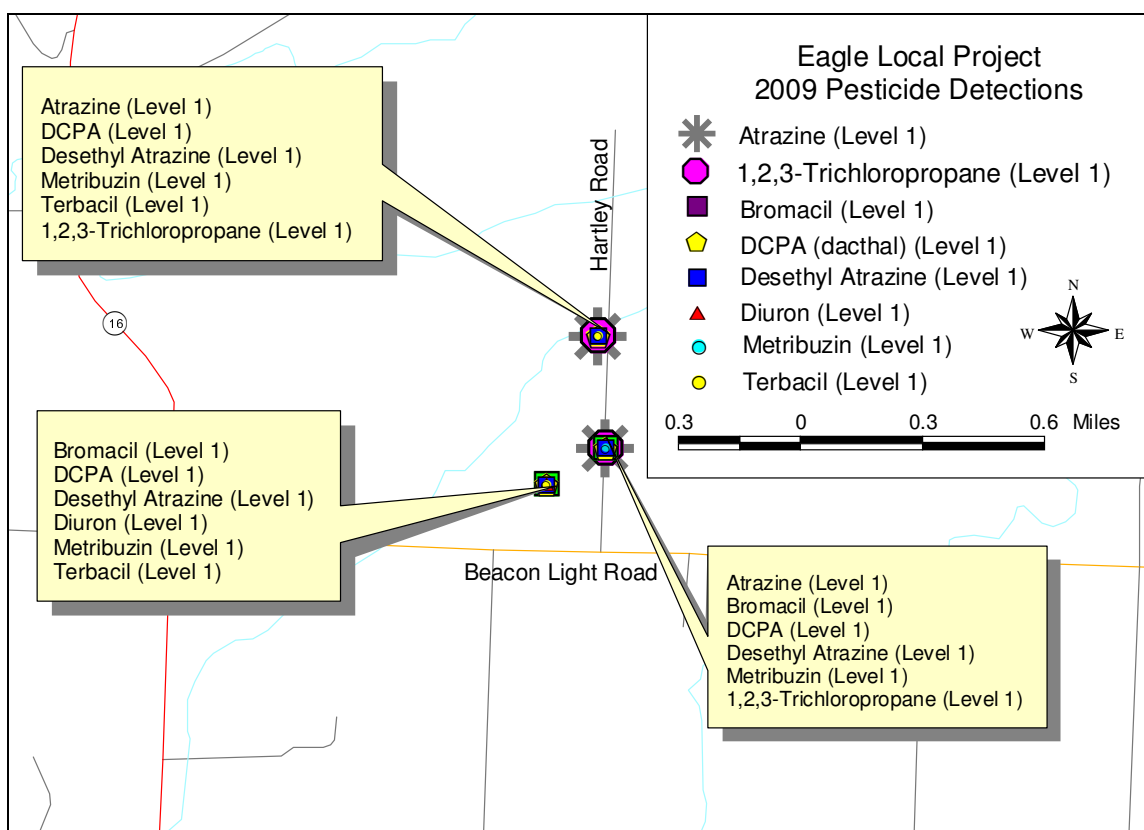


Figure 17. Pesticide results from 2009 sampling of the Eagle Local Project.

Table 21. Summary of 2009 Pesticide Results from the Eagle Local Project.

Pesticide	No. of Detections (% of wells sampled with detection)	Range (µg/L) (Min. – Max.)	Reference Point (µg/L)
1,2,3-Trichloropropane	2 (66.66%)	0.2 (0.90 – 1.1)	40 (HAL) ¹
Atrazine	2 (66.66%)	0.03	3 (MCL) ²
Bromacil	2 (66.66%)	0.06 (0.07 – 0.13)	90 (HAL)
DCPA (Dacthal)	3 (100%)	0.18 (0.29 – 0.47)	70 (HAL)
Desethyl Atrazine	3 (100%)	0.01 (0.08 – 0.09)	... ³
Diuron	1 (33.33%)	0.09	28 (FQPA DWLOC) ⁴
Metribuzin	3 (100%)	0.3	70 (HAL)
Terbacil	2 (66.66%)	0.24 (0.08 – 0.32)	90 (HAL)

¹HAL – EPA Lifetime Health Advisory.

²MCL – EPA Maximum Contaminant Level.

³Breakdown product of Atrazine. No reference point available, MCL for Atrazine of 3 µg/L is used.

⁴FQPA DWLOC– Food Quality Protection Act Drinking Water Level of Comparison.

Pesticide Management Plan Projects

Overview

In response to elevated pesticide detections from the 2005 regional project area monitoring efforts, Pesticide Management Plan (PMP) monitoring projects were established. Additional wells surrounding the original elevated pesticide detection were sampled to determine the extent of the pesticide contamination. The projects were designed to gain a better understanding of the pesticide plume in the ground water and the relative contaminant contributions from potential pollutant sources. The information will be used to implement the Rules Governing Pesticide Management Plans for Ground Water Protection (IDAPA 02.03.01). Currently, ISDA has four active PMP projects which include the following: Owyhee County DCPA (Dacthal) PMP Project (310), Fremont County Triallate PMP Project (320), Nez Perce County Atrazine PMP Project (330), and the Fruitland Atrazine PMP Project (340). Historically, the PMP projects were sampled for both inorganic compounds (including nitrate) and pesticides on an annual basis. In 2009, three of the four PMP projects were monitored for inorganic compounds. All four were sampled for pesticides.

Water Quality Findings

Nitrate

Owyhee County

In 2009, the 13 wells monitored in the Owyhee County DCPA (Dacthal) PMP Project (Project 310) located approximately two miles south of Homedale along Succor Creek Road (Figure 18), were also analyzed for nitrate in 2009. The project was initiated due to an elevated DCPA (dacthal) detection in 1999. In 2009, none of the wells tested exceeded the MCL for nitrate (Figure 18 and Table 22). The maximum nitrate concentration detection was 7.9 mg/L. The median value was 0.05 mg/L, and the mean value was 1.8 mg/L (Table 22).

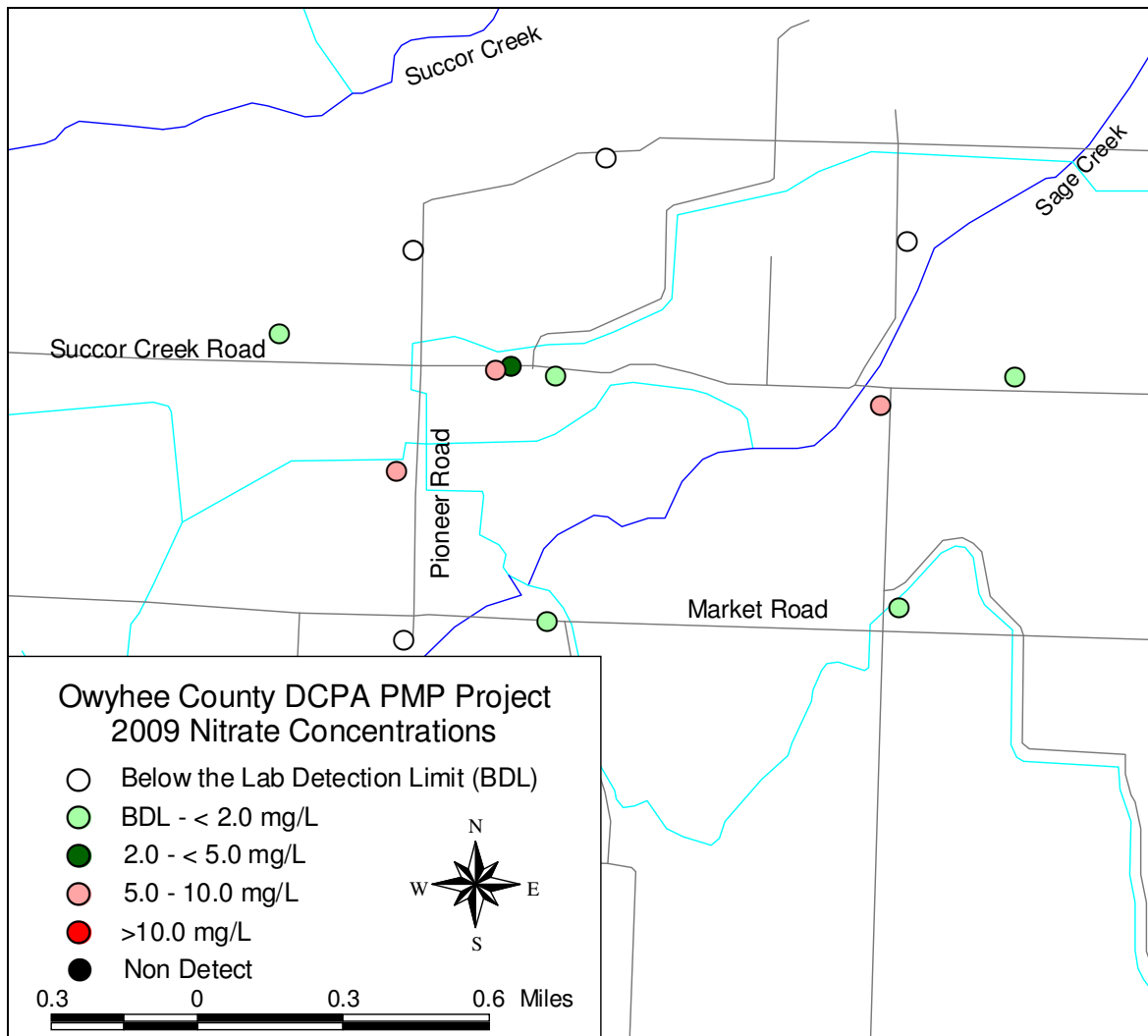


Figure 18. Nitrate results from 2009 sampling of the Owyhee County DCPA (Dacthal) PMP Project.

Table 22. Summary of 2009 Nitrate Results from the Owyhee County DCPA (Dacthal) PMP Project.

Concentration Range (mg/L)	Number of Wells
Below Lab Detection Limit (BDL) (0.05)	4 (30.7%)
BDL to < 2.0	5 (38.5%)
2.0 to < 5.0	1 (7.7%)
5.0 to 10	3 (23.1%)
>10	0 (0%)
Mean Value (mg/L)	1.8
Median Value (mg/L)	0.05
Maximum Value (mg/L)	7.9

Fremont County

The seven wells analyzed for pesticides as part of the ISDA Fremont County Triallate PMP Project (Project 320) located approximately six miles northeast of Ashton (Figure 19), were also analyzed for nitrate in 2009. This PMP project was initiated due to an elevated detection of triallate in 2003. In 2009, zero wells of the wells sampled had a nitrate concentration that exceeded the EPA's MCL of 10 mg/L. The maximum detection was 10 mg/L. The median value was 7.4 mg/L, while the mean value was 7.5 mg/L (Table 23).

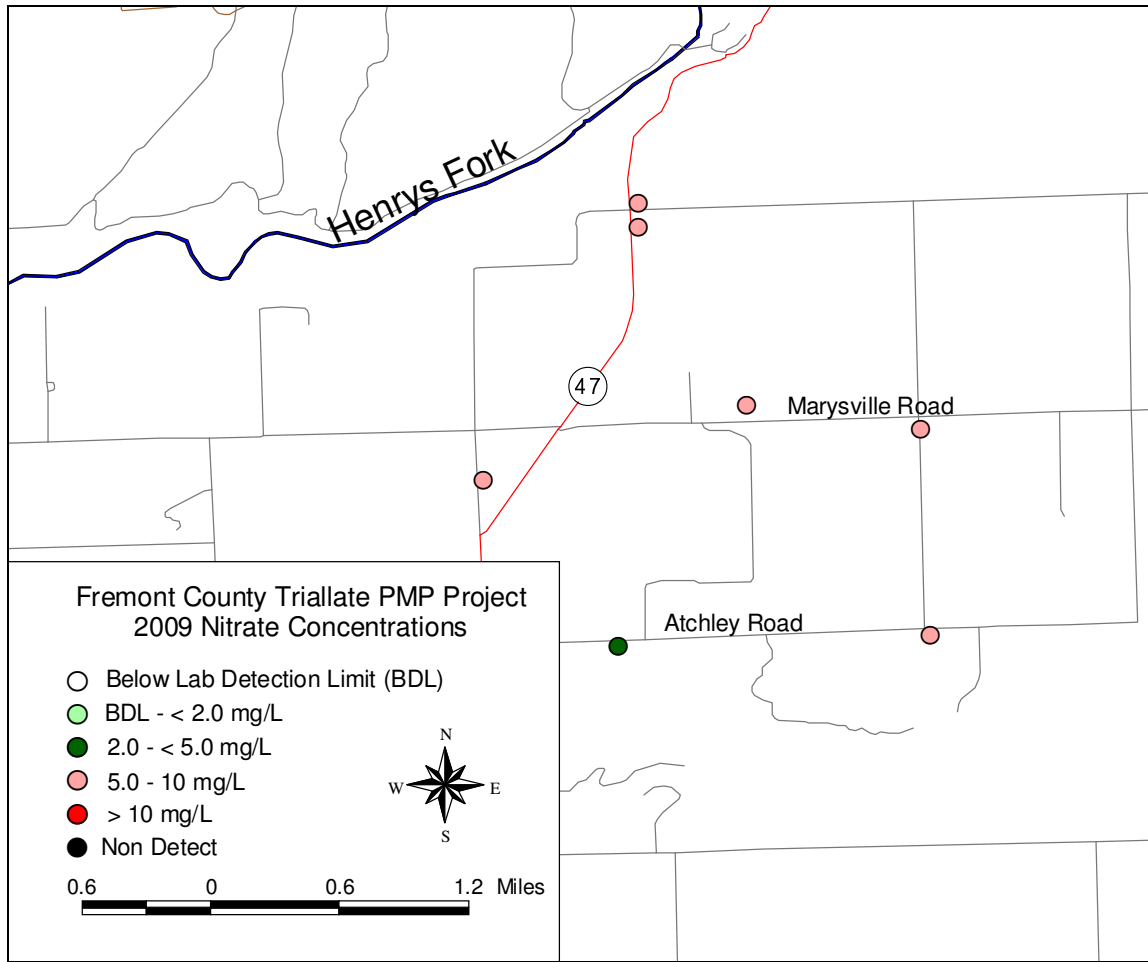


Figure 19. Nitrate results from 2009 sampling of Fremont County Triallate PMP Project.

Table 23. Summary of 2009 Nitrate Results from Fremont County Triallate PMP Project.

Concentration Range (mg/L)	Number of Wells (3 wells)
Below the Lab Detection Limit (BDL) (0.05)	0 (0%)
BDL to < 2.0	0 (0%)
2.0 to < 5.0	1 (14.3%)
5.0 to 10.0	6 (85.7%)
>10	0 (0%)
Mean Value (mg/L)	7.5
Median Value (mg/L)	7.4
Maximum Value (mg/L)	10

Payette County

The Fruitland Atrazine PMP Project, located in Fruitland (Figure 20), was initiated due to an elevated desethyl atrazine (a breakdown product of atrazine) in 2005. In 2009, the seven wells monitored in the Fruitland Atrazine PMP Project were analyzed for nitrate. Two of the seven wells sampled had nitrate concentrations exceeding the EPA MCL (Figure 20 and Table 24). The maximum detection was 13 mg/L. The median value was 7.0 mg/L, while the mean value was 6.9 mg/L (Table 24).

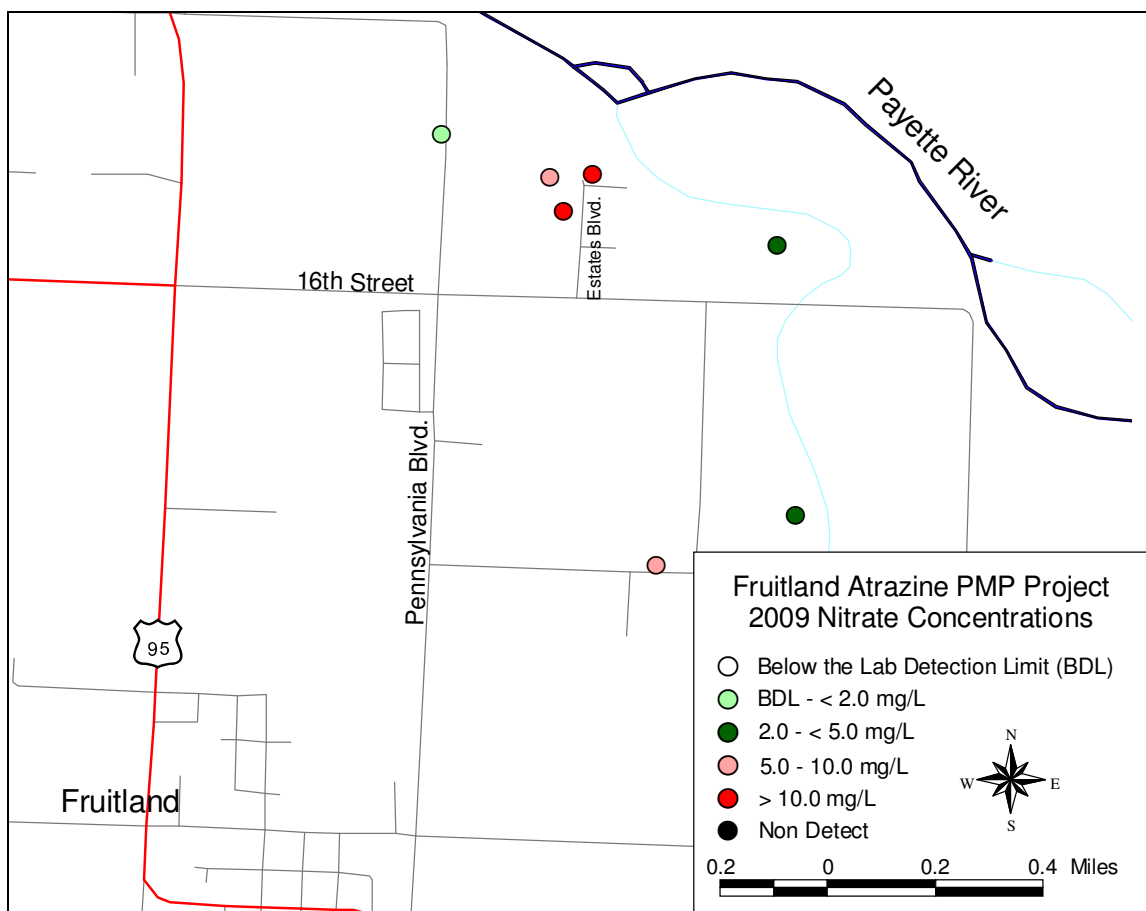


Figure 20. Nitrate results from 2009 sampling of the Fruitland Atrazine PMP Project.

Table 24. Summary of 2009 Nitrate Results from the Fruitland Atrazine PMP Project.

Concentration Range (mg/L)	Number of Wells
Below the Lab Detection Limit (BDL) (0.05)	0 (0%)
BDL to < 2.0	1 (14.2%)
2.0 to < 5.0	2 (28.6%)
5.0 to 10	2 (28.6%)
>10	2 (28.6%)
Mean Value (mg/L)	6.9
Median Value (mg/L)	7.0
Maximum Value (mg/L)	13

Pesticides

Owyhee County

A PMP project designed to monitor 13 wells Owyhee County, southwest of Homedale, Idaho was created in response to an elevated detection of DCPA (dacthal) in a well (well ID 3100101) originally part of the North Owyhee County Regional Project. In 2009, the 13 wells in the Owyhee County Dacthal PMP Project were analyzed for pesticides (Figure 21). Six wells, or 46% of wells sampled, had positive detections of DCPA (dacthal). The other seven wells had no pesticides detected in the ground water. Of the six wells with DCPA (dacthal) detections, well 3100101 (Figure 21), which has had historically elevated detections of DCPA, had a Level 2 DCPA (dacthal) detection (a detection at 20% to less than 50% of the reference point) (Figures 21 and 22); the remaining five wells had Level 1 detections (a detection above the detection limit to less than 20% of the reference point) (Figure 21). Three of the five wells with Level 1 DCPA (dacthal) detections had additional pesticides detected; including Level 1 detections of atrazine, desethyl atrazine and bentazon. The pesticide detections from the 13 wells that were sampled are presented in Table 25. All pesticide detections in the follow up sampling were below any health standards set by EPA or the state of Idaho.

Well 3100101 has had historical elevated detections of DCPA. Due to the concentration detected in this well in 1999, follow-up sampling was conducted which resulted in the development of a PMP response monitoring project. The concentration of DCPA in well 3100101 has been tracked over the past 10 years (Figure 22). DCPA was detected at a Level 3 in 1999 and remained a Level 3 until 2001. In 2002, the concentration decreased resulting in a Level 1 detection. The concentration increased to a Level 2 in 2003 and 2004. The 2005 monitoring resulted in a Level 4 detection (a detection that exceeds the reference point). The large increase in concentration between April 2004 and April 2005 prompted quarterly monitoring for a year, to identify potential seasonal changes that might be missed by annual sampling. The quarterly monitoring and 2007 detection seemed to indicate a decreasing trend with potential seasonal variability. In 2008, the DCPA concentration in 3100101 increased up to a Level 3. The last annual monitoring effort, conducted in April 2009, showed a decrease in concentration down to a Level 2 detection (Figure 22). A DCPA PMP Rule, which restricts the use of DCPA within a four-square mile area southwest of Homedale, Idaho was passed by the Idaho Legislature in the spring of 2007. Tracking the trend in well 3100101 and other wells nearby will be important in determining if the management approach is working to protect ground water in this area.

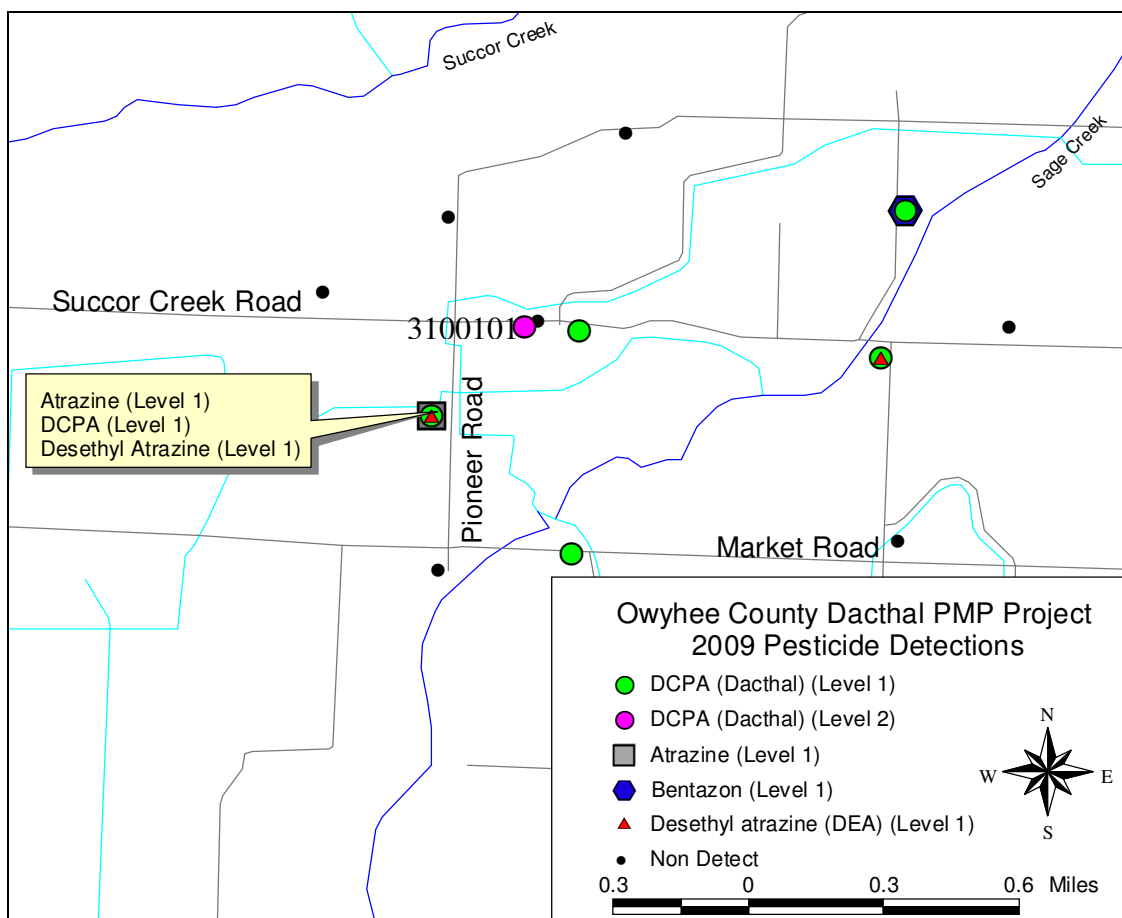


Figure 21. Pesticide results from the 2009 sampling of the Owyhee County DCPA (Dacthal) PMP Project.

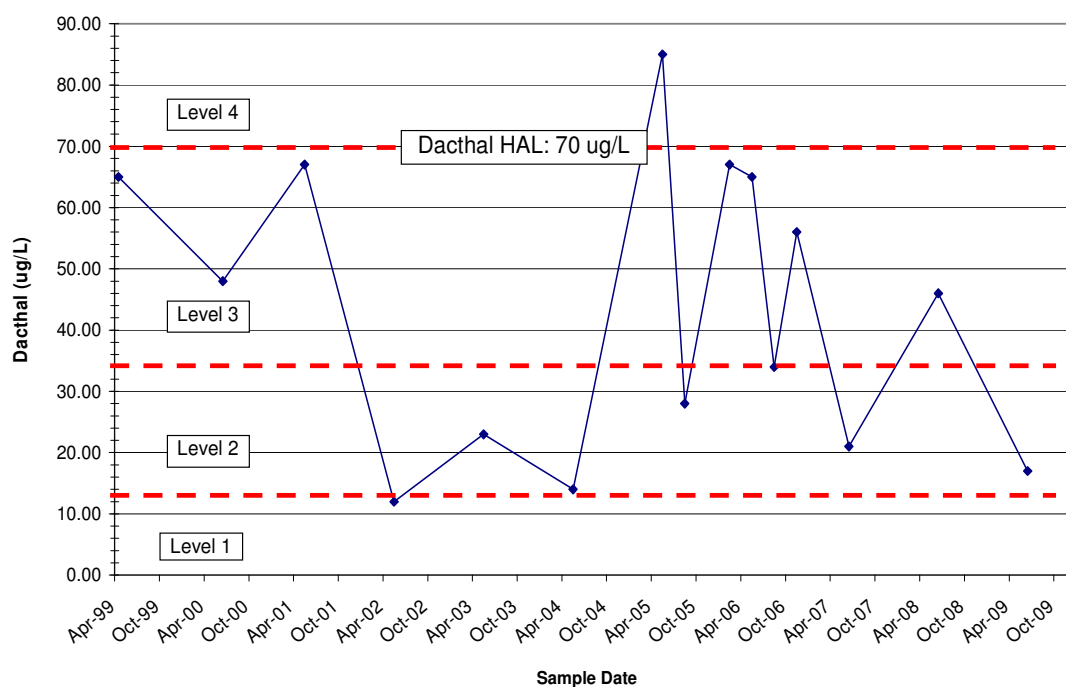


Figure 22. Time-series plot of DCPA concentrations detected in well ID 3100101.

Table 25. Summary of 2009 Pesticide Results from the Owyhee County DCPA (Dacthal) PMP Project.

Pesticide	No. of Detections (% of wells sampled with detection)	Range (µg/L) (Min. – Max.)	Reference Point (µg/L)
Atrazine	1 (7.7%)	0.05	3 (MCL) ¹
Bentazon	1 (7.7%)	1.6	200 (HAL) ²
DCPA (dacthal)	6 (46%)	16.91 (0.09 – 17)	70 (HAL)
Desethyl Atrazine	2 (15.4%)	0 (0.03 – 0.03)	--- ³

¹MCL – EPA Maximum Contaminant Level.

²HAL – EPA Lifetime Health Advisory.

³Breakdown product of Atrazine. No reference point available, MCL for Atrazine of 3 µg/L is used.

Fremont County

The elevated concentrations of triallate in well 3200101 led to the development of Fremont County Triallate PMP Project. Wells nearby well 3200101 were selected and sampled annually, in order to characterize the extent of elevated triallate concentrations in the ground water. Seven wells from the Fremont County Triallate PMP Project (Figure 23) were sampled for pesticides in 2009. Two of the seven wells had a positive detection of at least one pesticide. Three pesticide active ingredients or breakdown products were positively detected. The well that initiated the project with an elevated detection of triallate (well ID 3200101) had a Level 4 triallate detection in 2009 (a detection that exceeds the FQPA DWLOC for triallate) (Figures 23 and 24). A summary of the pesticide detections from the 2009 monitoring effort are presented in Table 26.

The triallate concentrations in well 3200101 continue to be a concern as they have been equal to or above 20% of the reference point of 0.45 µg/L since 2003, when the Middle Henrys Fork Central Basin Regional Project was initiated and well 3201010 was first sampled. The triallate concentrations in Well 3200101 increased from a Level 2 in 2003, to a Level 3 in 2004 and to a Level 4 in 2005. In 2006, the concentration decreased down to a Level 2 detection. Since 2006, the triallate concentration has gradually increased each year back to a Level 4; increasing from a 0.09 µg/L in 2006 to a 0.49 µg/L in 2009 (Figure 24).

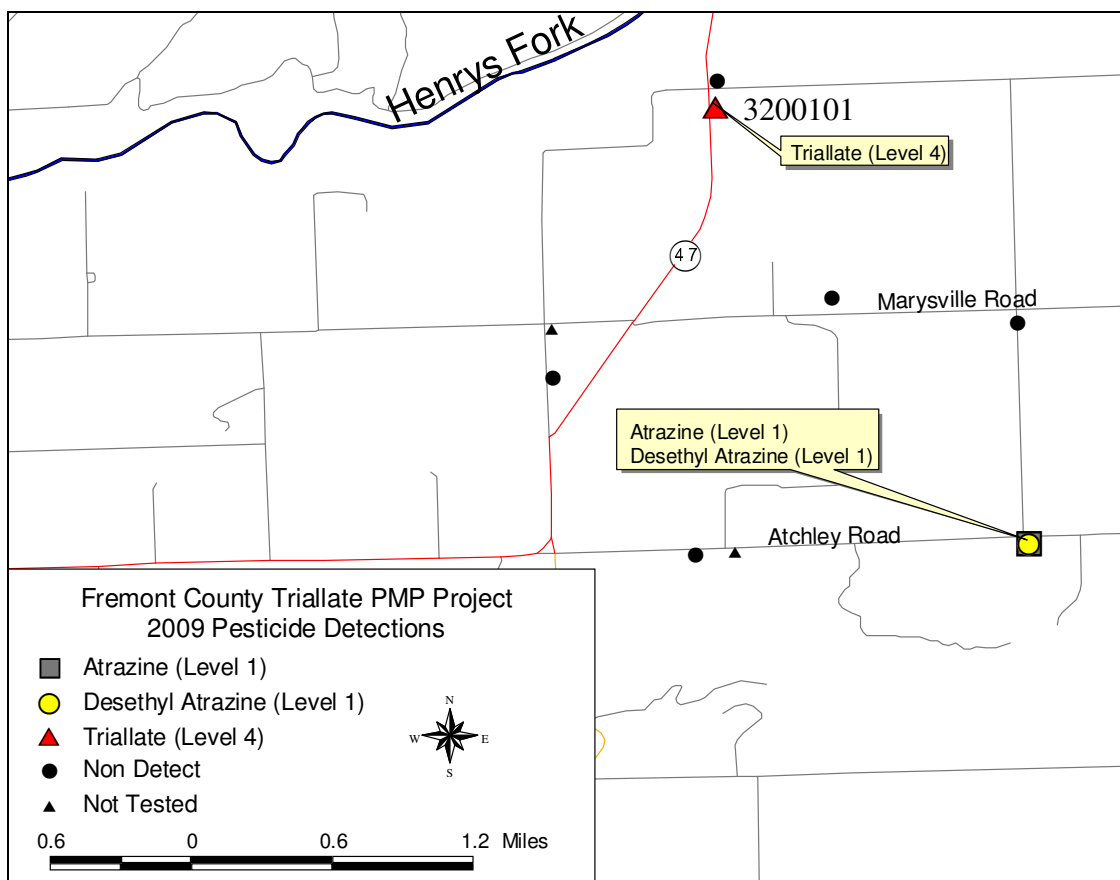


Figure 23. Pesticide results from 2009 sampling of the Fremont County Triallate PMP Project.

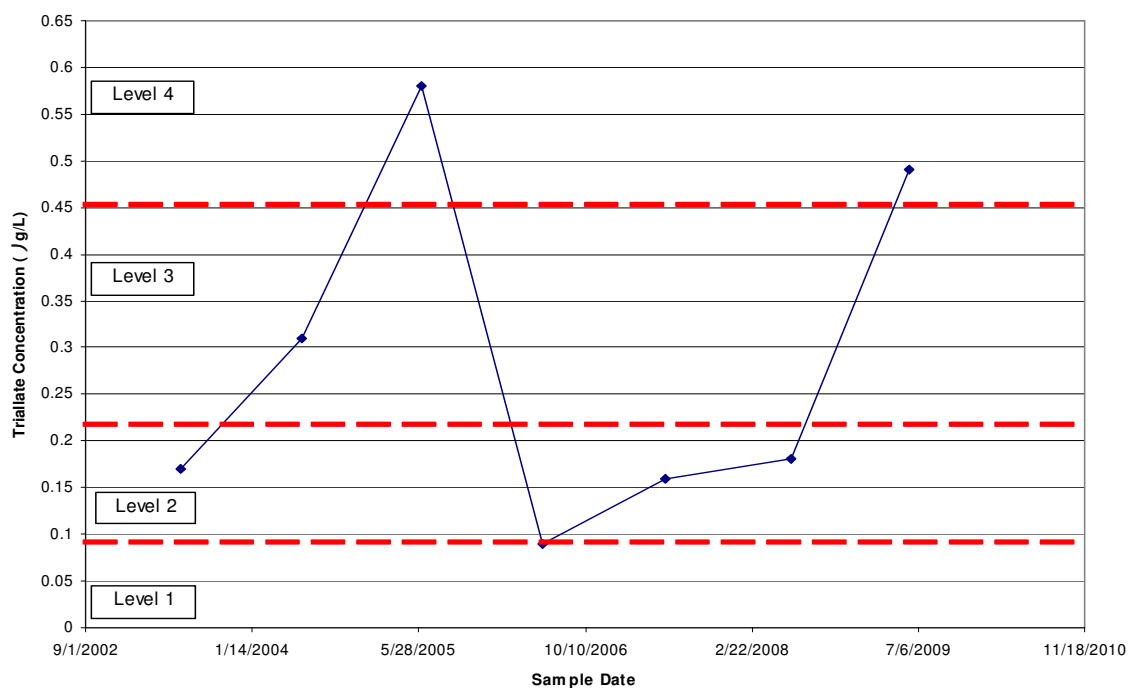


Figure 24. Time-series plot of triallate concentrations detected in well 3200101.

Table 26. Summary of 2008 Pesticide Results from the Fremont County Triallate PMP Project.

Pesticide	No. of Detections (% of wells sampled with detection)	Range (µg/L)	Reference Point (µg/L)
Atrazine	1 (33.3%)	0.05	3 (MCL) ¹
Desethyl Atrazine	1 (33.3%)	0.03	....²
Triallate	1 (33.3%)	0.49	0.45 (FQPA DWLOC) ³

¹MCL – EPA Maximum Contaminant Level.

²Breakdown product of Atrazine. No reference point available, MCL for Atrazine of 3 µg/L is used.

³FQPA DWLOC – Food Quality Protection Act Drinking Water Level of Comparison.

Nez Perce County

The Nez Perce County Atrazine PMP project is located in Nez Perce County southwest of Lewiston and Lewiston Orchards along Waha Road (Figure 25). The project was initiated in response to an elevated detection of atrazine in a well from the Clearwater Plateau Regional Study (well ID 3300101) in 2001 (Figure 25). Only two wells (including well 3300101) from the Nez Perce County Atrazine PMP Project were sampled for pesticides in 2009. The results of the 2009 sampling are shown in Figure 25 and Table 27. A total of five pesticide active ingredients or breakdown products were detected. The well with the historic elevated detections of atrazine (well ID 3300101) had positive detections of all five pesticide active ingredients or breakdown products, including a Level 2 detection (a detection at 20% to less than 50% of the reference point) of atrazine and a Level 3 detection (a detection at 50% to less than 100% of the reference point) of desethyl atrazine (a breakdown product of atrazine) (Figures 25 and 26). The other well had Level 1 detections (a detection above the detection limit to less than 20% of a reference point) of both desethyl atrazine and diuron. The pesticide detections from the two wells are presented in Table 27. All pesticide detections in the follow up sampling were below any health standards set by EPA or the state of Idaho.

The atrazine and desethyl atrazine concentrations in well 3300101 have been tracked over time to determine if the concentrations were increasing, decreasing or remaining stable. Since 2001, the concentrations have changed between Level 2 and Level 3 detections for both atrazine and desethyl atrazine. The changes in concentration of atrazine and desethyl atrazine have been similar, with the exception of 2009, when the atrazine remained at a Level 2 and the desethyl atrazine increased to a Level 3 (Figure 26).

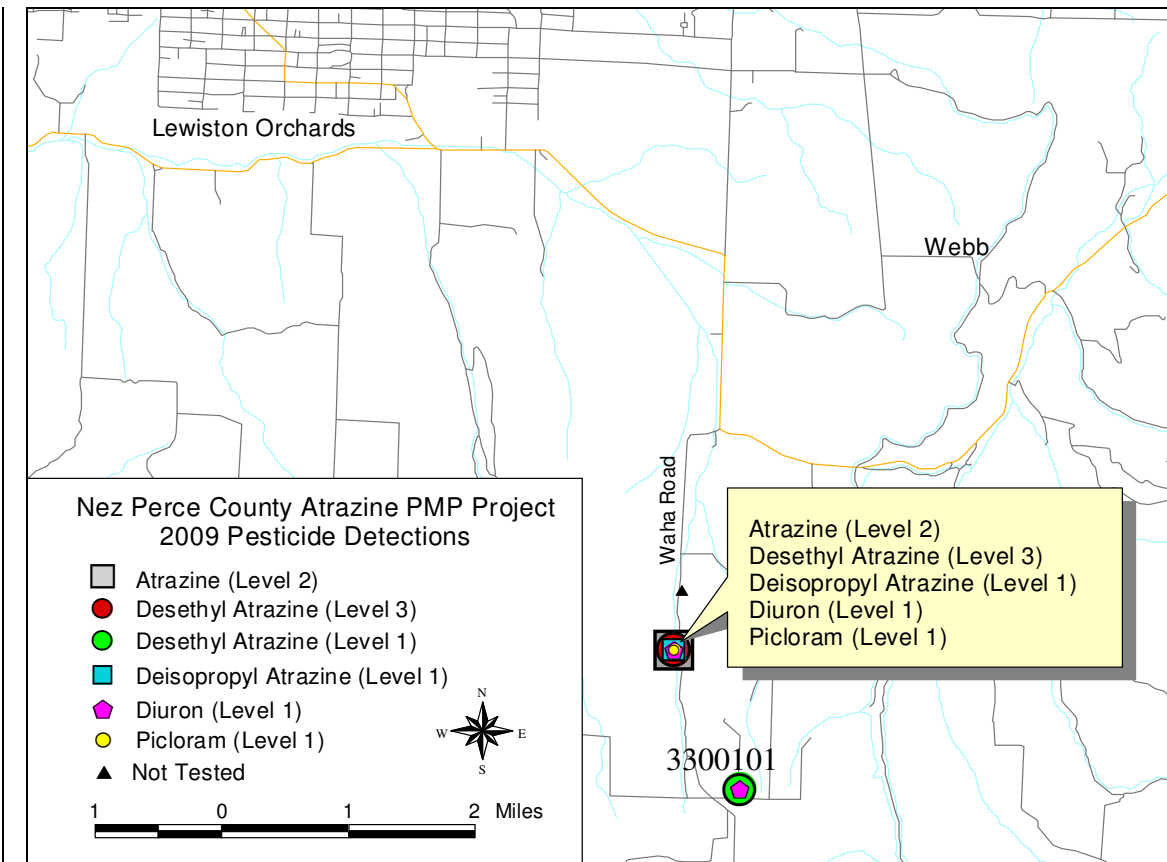


Figure 25. Pesticide results from 2009 sampling of Nez Perce County Atrazine PMP Project.

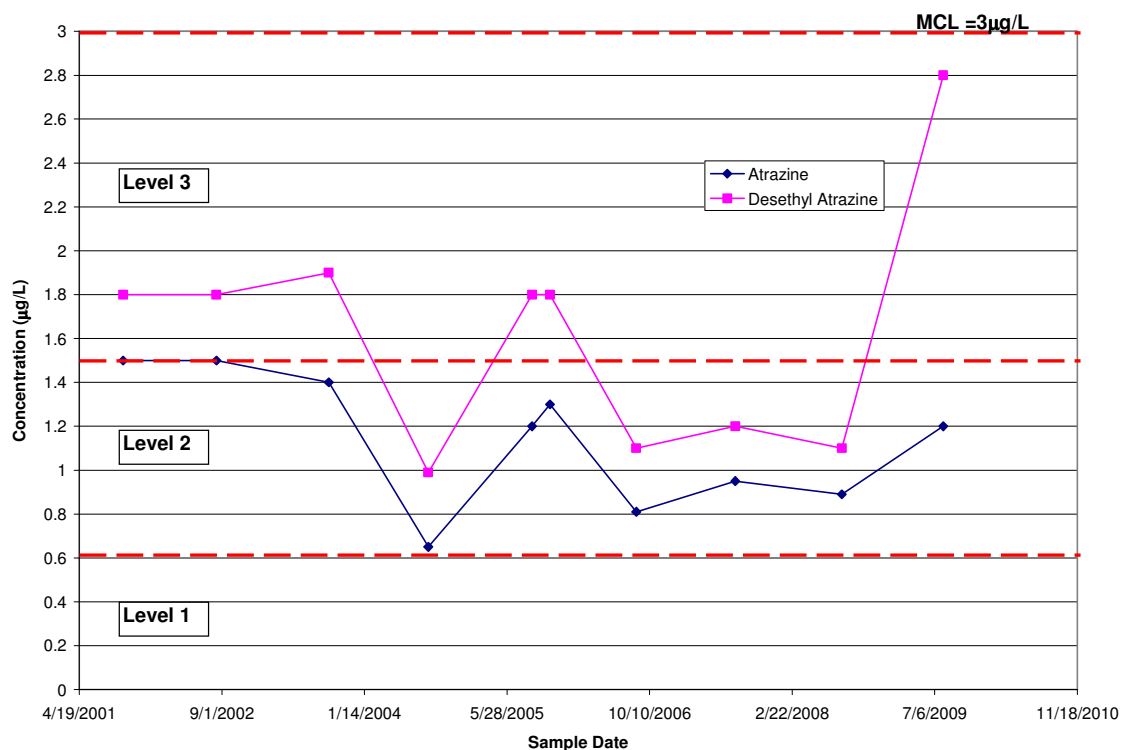


Figure 26. Time-series plot of atrazine and desethyl atrazine concentrations detected in well 3300101.

Table 27. Summary of 2009 Pesticide Results from the Nez Perce County Atrazine PMP Project.

Pesticide	No. of Detections (% of wells sampled with detection)	Range (µg/L) (Min. – Max.)	Reference Point (µg/L)
Atrazine	1 (50%)	1.2	3 (MCL) ¹
Desethyl Atrazine	2 (100%)	2.66 (0.14 – 2.8)	....²
Deisopropyl Atrazine	1 (50%)	0.03	....²
Diuron	2 (100%)	0.13 (0.04 – 0.17)	21 (RfD) ³
Picloram	1 (50%)	0.34	500 (MCL)

¹MCL – EPA Maximum Contaminant Level.

²Breakdown product of Atrazine. No reference point available, MCL for Atrazine of 3 µg/L is used.

³RfD– EPA Reference Dose.

Payette County

A total of seven wells, including the well (well ID 3400101) with the initial elevated concentration of desethyl atrazine (a breakdown product of atrazine), were sampled for pesticides in 2009 (Figure 27). Five wells had Level 1 detections (a detection above the detection limit and less than 20% of the reference point) of one or more pesticide active ingredient(s) or breakdown products. Four wells had Level 1 atrazine detections and three wells had Level 1 desethyl atrazine and deisopropyl atrazine detections, both breakdown products of atrazine. Two wells had Level 1 DCPA (dacthal) detections. The monitoring results from the seven wells that were sampled are presented in Table 28. All pesticide detections in the follow up sampling were below any health standards set by EPA or the state of Idaho.

The atrazine and desethyl atrazine concentrations in wells 3400101, 3400501 and 3400801 have been tracked over time to determine if the concentrations were increasing, decreasing or remaining stable. Atrazine concentrations in 3400101 gradually increased from 2005 to 2008 and then decreased in 2009. The atrazine concentrations in wells 3400501 and 3400801 followed a similar pattern of decreasing from 2005 to 2006, remaining stable or slightly increasing from 2006 to 2007 then decreasing to a Level 1 in 2008 and again in 2009 (Figure 28). All three wells show a decrease in desethyl atrazine from 2005 to 2006. From May 2006 to May 2007, the desethyl atrazine concentration increases in well 3400101, remains stable in well 3400501 and decreases in well 3400801. From May 2007 to May 2008, desethyl atrazine continues to increase in well 3400101 and decreases to a Level 1 detection in both wells 3400501 and 3400801. All three wells show a decrease in desethyl atrazine in from May 2008 to May 2009 (Figure 29). Overall, the three wells decreased from Level 3 and Level 2 detections to Level 1 detections for both atrazine and desethyl atrazine (Figures 28 and 29).

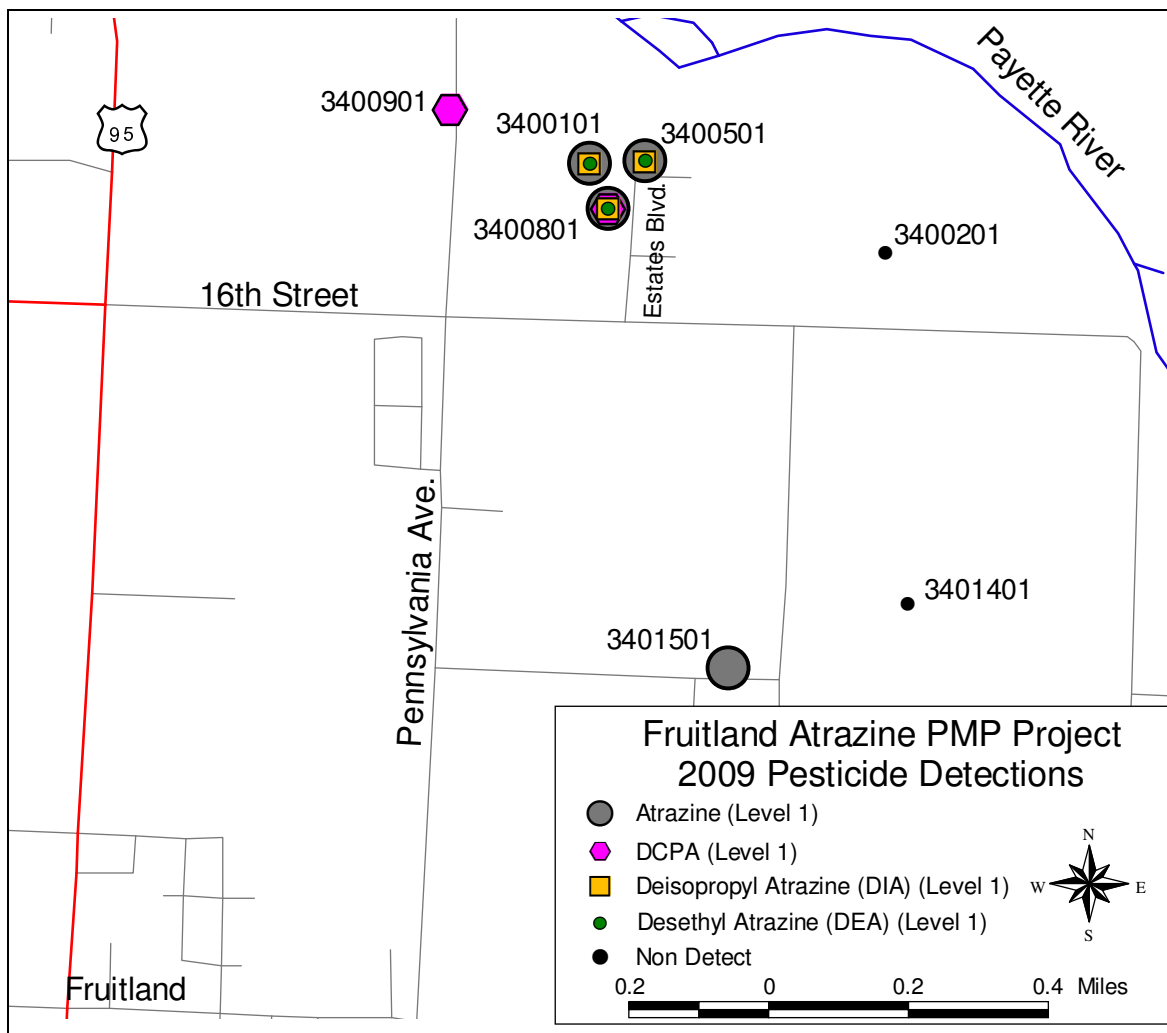


Figure 27. Pesticide results from 2009 sampling of the Fruitland Atrazine PMP Project.

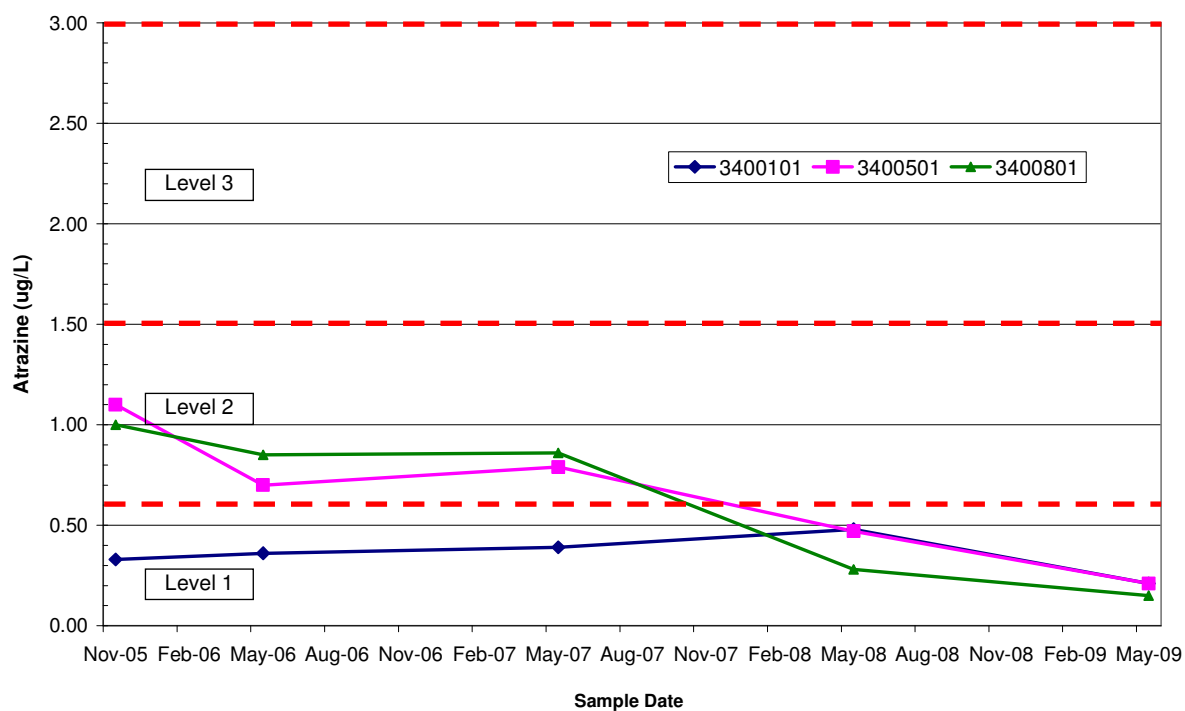


Figure 28. Time-series plot of atrazine concentrations detected in wells 3400101, 3400501, and 3400801.

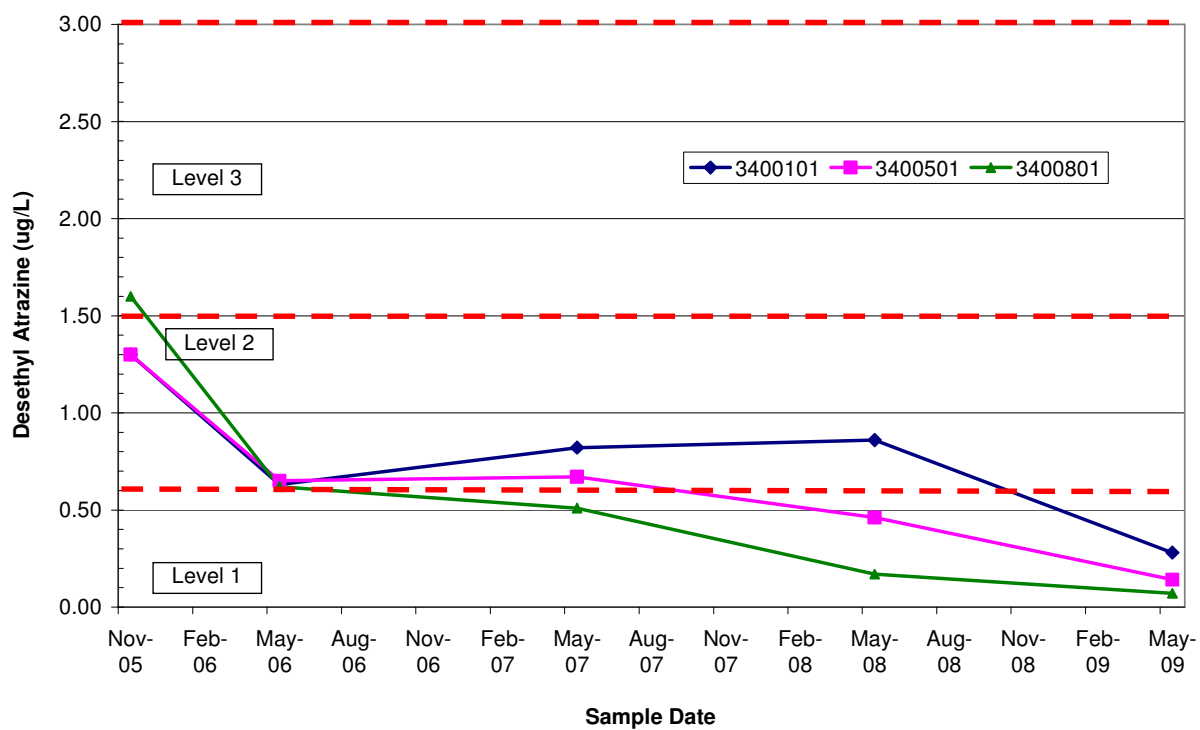


Figure 29. Time-series plot of desethyl atrazine concentrations detected in wells 3400101, 3400501, and 3400801.

Table 28. Summary of 2009 Pesticide Results from the Fruitland Atrazine PMP Project.

Pesticide	No. of Detections (% of wells sampled with detection)	Range (µg/L) (Min. – Max.)	Reference Point (µg/L)
Atrazine	4 (57.1%)	0.18 (0.03 – 0.21)	3 (MCL) ¹
DCPA (Dacthal)	2 (28.5%)	0.05 (0.1 – 0.15)	70 (HAL) ²
Desethyl Atrazine	3 (42.9%)	0.07 (0.07 – 0.14)	....³
Deisopropyl Atrazine	3 (42.9%)	0.04 (0.04 – 0.08)	....³

¹MCL – EPA Maximum Contaminant Level.

²HAL – EPA Lifetime Health Advisory.

³Breakdown product of Atrazine. No reference point available, MCL for Atrazine of 3 µg/L is used.

Discretionary Pesticide Projects

Overview

The ISDA Ground Water Program submits discretionary grant proposals to the EPA each year to acquire funding to complete pesticide related projects and activities. Typically, the Ground Water Program receives one grant each year to conduct additional pesticide related monitoring in the state.

The 2008/2009 monitoring grant allowed for testing a total of 16 wells (13 wells in the fall of 2008 and three in the spring of 2009), for 13 new pesticides (Table 29). New pesticides have been registered in Idaho during the past few years. Several of these newly registered products are not on the pesticide analytical screen used by ISDA testing to evaluate ground water. ISDA worked with the University of Idaho Analytical Sciences Laboratory to develop methods for 13 pesticides that had not previously been analyzed for by ISDA's ground water monitoring program. The goal of the project was to monitor wells with previous pesticide detections for the 13 new pesticides that ISDA has not analyzed for in agricultural areas.

The data will be used to gain a better understanding of the 13 pesticides and if they are leaching to ground water. In addition, the data will be used to evaluate the need to add these extra pesticides to ISDA's ground water pesticide monitoring program. The information will be used to make regulatory and/or voluntary practice changes on land contributing to the contamination and to implement IDAPA 02.03.01 Rules Governing Pesticide Management Plans for Ground Water Protection.

The 2009/2010 monitoring grant allowed for quarterly testing of 15 wells, from existing projects in southwest Idaho with previous pesticide detections. This discretionary project was developed when follow-up samples from two regional wells with recent elevated aldicarb sulfone detections (Level 3 and Level 4) from the Washington and Payette Counties Regional Study, resulted in no positive detections or were 'non detect'. Due to the aldicarb sulfone concentrations decreasing from Level 3 and 4 detections to non detect over a four month time period, quarterly monitoring was identified as a way to capture potential fluctuations in the pesticide concentrations potentially missed with annual (and even follow up) monitoring. In addition to the two wells with aldicarb sulfone detections, additional wells from the Washington and Payette Counties Regional Study and select wells from the Owyhee County DCPA PMP project and the Fruitland Atrazine PMP Project were included in this quarterly monitoring effort.

Water Quality Findings

2008/2009 Discretionary Project: Statewide Ground Water Monitoring for 13 New Pesticides Discretionary Project

In the fall of 2008, ISDA sampled 13 wells with previous pesticide detections for 13 new pesticides (Table 29) throughout southern Idaho (Figure 30). In the spring of 2009, three additional wells were sampled for the 13 new pesticides (Table 29). New methodologies for these 13 pesticides were established through the Boise Urban Discretionary Project, making it possible to test for these compounds in wells with previous pesticide detections. None of the 13 new pesticides were detected. Seven pesticides were detected in nine wells and all detections were Level 1 detections (a detection above the detection limit and less than 20% of a reference point) (Figure 30 and Table 30). All detections were below any Idaho or EPA health standards.

Table 29. Pesticides Added to ISDA's Analytical Screen.

Pesticide	Use	Crops	Common Trade Name
Acephate	Insecticide	Beans	Avatar, Cheminova, Executioner, Orthene
Azoxystrobin	Fungicide	Alfalfa, barley, beans, corn, onions, potatoes, sugar beets, triticale	Abound, Amistar, Cruiser Extreme, Dynasty, Heritage, Quadris
Chlorsulfuron	Herbicide	Barley, triticale, wheat	Chisum, Cimarron, Telar, Finesse, Glean, Landmark, Report, Throttle
Clopyralid	Herbicide	Corn, barley, wheat	Accent, Commando, Curtail, Cutback, Redeem, Surestart
Cyfluthrin	Insecticide	Alfalfa, beans, corn, peas, potatoes	Aztec, Baythroid, Defcon, Leverage, Power Force Multi-Insect Killer RTS, Renounce, Tombstone
Cypermethrin	Insecticide	Non-crop areas, onions	Cypermethrin, Demon, Holster, Prevail, Up-Cycle
Glyphosate	Herbicide	Corn, barley, beans, non-crop areas	Fireball, Halex, Roundup, Sequence, Touchdown, Traxion
Imazapyr	Herbicide	Field corn, non-crop areas	Imazuron E Pro, Lightning, Lineage, Sahara, SSI Maxim Arsenal, Topsite
Imidacloprid	Insecticide	Barley, beans, peas, potatoes, corn, wheat	Admire, Agri Star Impulse, Agri Star Macho, Advise, Nitro, Alenza, Alias, Areca, Attendant, Aura, Brigadier, Concur, Couraze, Dyna-Shield, Gaucho, Hawk-I N/O 2L, Imida E AG, Imidamax 4F, Imigold, Lada, Mana Alias, Marathon, Midash, Montana, Nitro Shield, Nuprid, Pasada, Prey, Provado, Quali-Pro Imidacloprid, Raxil, Senator, Sherpa, Torrent
Iprodione	Fungicide	Beans, potatoes, onions	Iprodione 4L AG, Nevado, Rovral
Oryzalin	Herbicide	Grapes, berries, orchards	Surflan
Propiconazole	Herbicide	Corn, wheat, barley, onions	Bumper, Concert, Propiconazole E AG, Propimax EC, Quilt, Stratego, Tilt
Trifluralin	Herbicide	Wheat, alfalfa, barley, dry beans, onions	Agri Star Trifluralin, Agrisolutions Trust, American Brand Herbicide Granules Containing Treflan, Buckle, Treflan, Triap, Triflurex, Trust

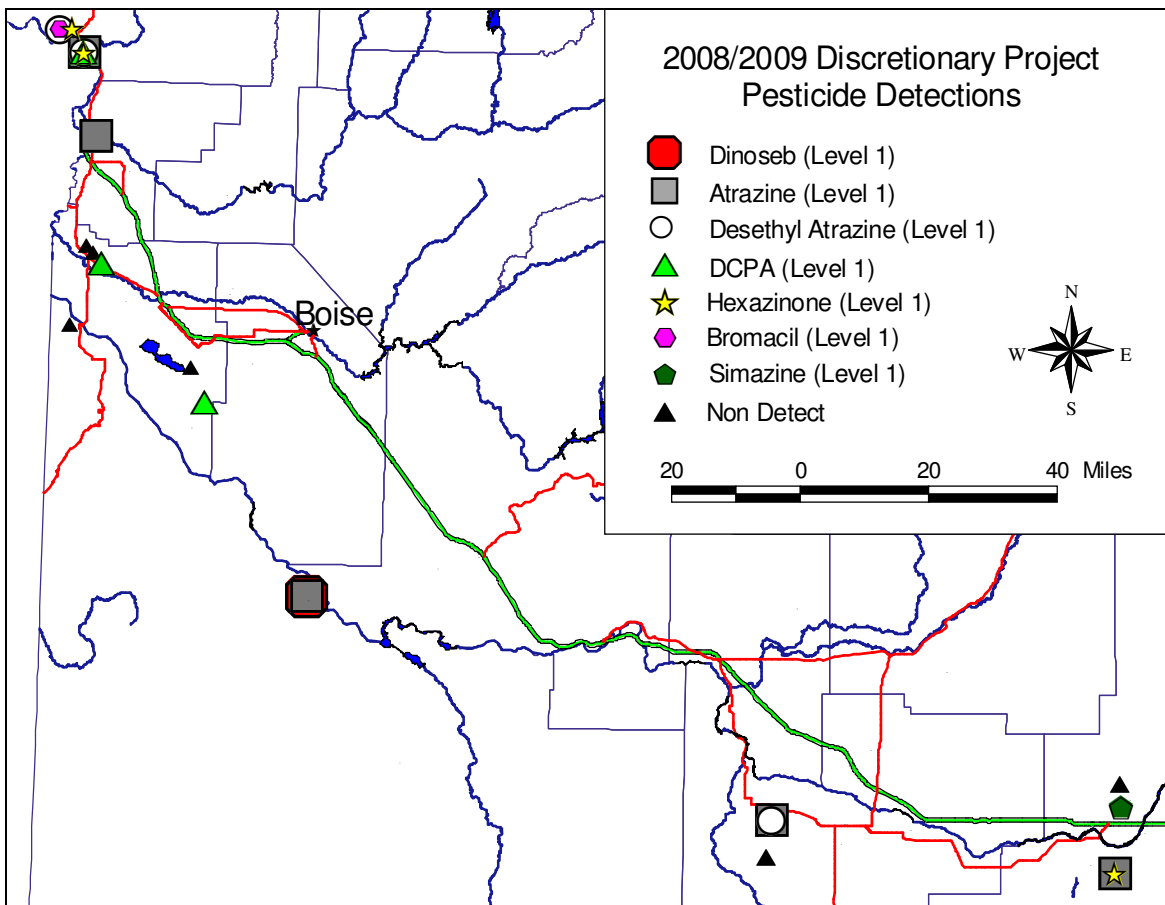


Figure 30. Pesticide results from 2008/2009 sampling of the Statewide Ground Water Monitoring for 13 New Pesticides Discretionary Project.

Table 30. Summary of Pesticide Results from the 2008/2009 Discretionary Project: Statewide Ground Water Monitoring for 13 New Pesticides.

Pesticide	No. of Detections (16 wells)	Range (µg/L) (Min. – Max.)	Reference Point (µg/L)
Atrazine	5	0.05 (0.04 – 0.09)	3 (MCL) ¹
Bromacil	1	0.32	90 (HAL) ²
Dacthal	2	0.97 (0.33 – 1.3)	70 (HAL)
Desethyl Atrazine	4	0.03 (0.04 – 0.07)	....³
Dinoseb	1	1.3	7 (MCL)
Hexazinone	3	0.1 (0.05 – 0.15)	400 (HAL)
Simazine	1	0.16	4 (MCL)

¹MCL – EPA Maximum Contaminant Level

²HAL – EPA Lifetime Health Advisory

³Breakdown product of Atrazine. No reference point available, MCL for Atrazine of 3 µg/L is used

2009/2010 Discretionary Project: Quarterly Ground Water Monitoring for 15 Wells

In the fall of 2009, ISDA sampled 15 select wells with previous pesticide detections in one regional project (Washington and Payette Counties Regional Project) (Figure 31 and Table 31) and two PMP projects (Owyhee County DCPA PMP project (Figures 32-33 and Table 32) and the Fruitland Atrazine PMP Project (Figures 34-36 and Table 33)) in southern Idaho. Fourteen of the 15 wells sampled had detections of one or more pesticide active ingredient or breakdown product. Nine pesticide active ingredients or breakdown products were detected. Atrazine and its breakdown product desethyl atrazine were the most commonly detected with seven and eight detections, respectively. Deisopropyl atrazine, another breakdown product of atrazine, with six detections and DCPA (dacthal) and bromacil each with five detections were the next three most commonly detected compounds. Two wells had elevated detections of desethyl atrazine; a Level 3 in the Washington and Payette Counties Regional Project and a Level 2 in the Fruitland Atrazine PMP Project (Figures 31 and 34-36, Tables 31 and 33). All detections were below any Idaho or EPA health standards.

The wells with historic elevated detections in the Owyhee County DCPA PMP project and the Fruitland Atrazine PMP project have been tracked for changes by plotting data versus time. The well in the Owyhee County DCPA PMP project with elevated DCPA showed a slight decrease in DCPA concentration compared to results from the last sampling effort in April 2009 (Figure 33). The changes in concentration of atrazine from May 2009 to November 2009 were small. Wells 3400501 and 3400801 remained the same or showed a slight increase, while well 3400101 showed a decrease. The atrazine concentration in all three wells remained at a Level 1. Well 3400101 also showed a decrease in desethyl atrazine from May 2009 to November 2009. Wells 3400501 and 3400801 both showed an increase in concentration of desethyl atrazine from May 2009 to November 2009; however the increase in 3400501 was much greater and resulted in a Level 2 detection. (Figures 35 and 36).

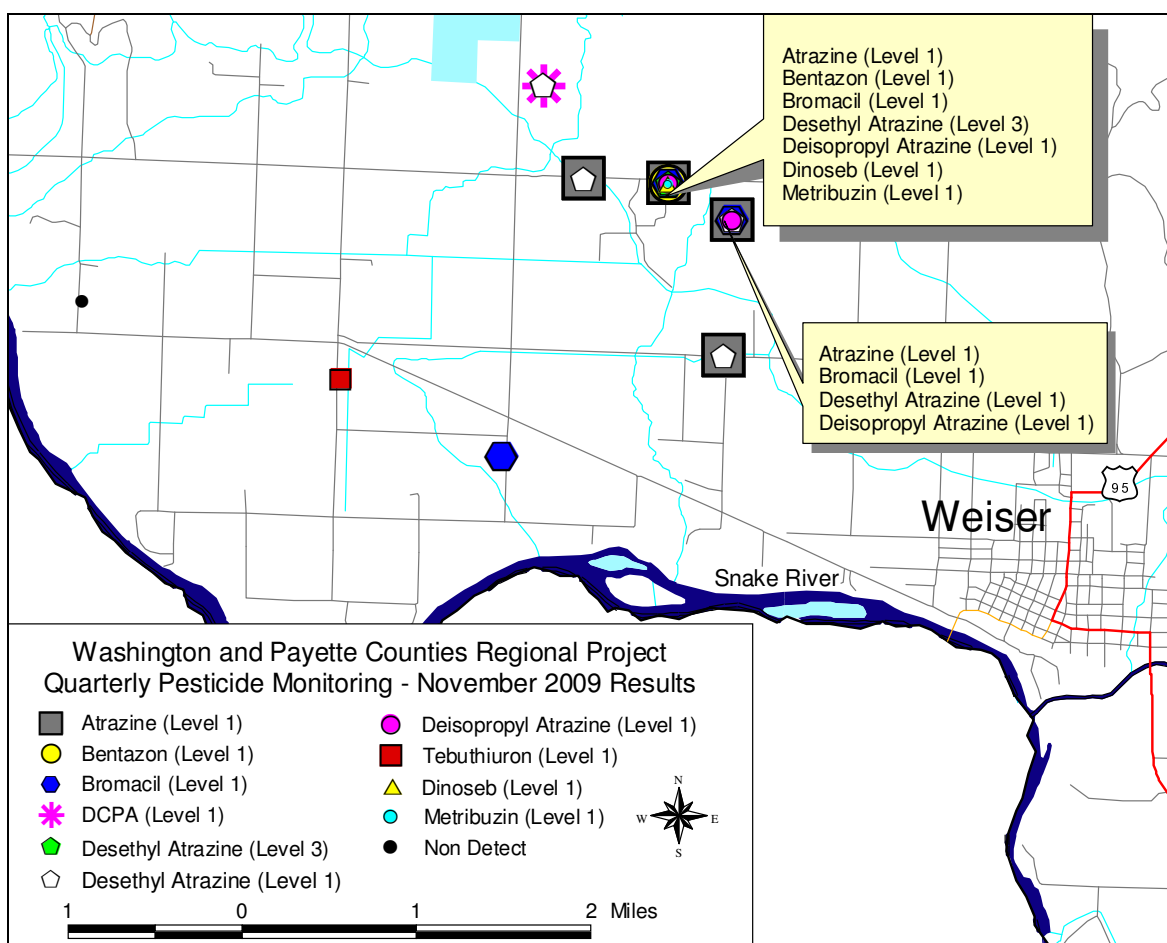


Figure 31. 2009/2010 Quarterly Monitoring Discretionary Project results from the November (1st round) monitoring of select wells in the Washington and Payette Counties Regional Study.

Table 31. 2009/2010 Quarterly Monitoring Discretionary Project Results from the November (1st round) Monitoring of Select Wells in the Washington and Payette Counties Regional Study.

Pesticide	No. of Detections (8 wells)	Range (µg/L) (Min. – Max.)	Reference Point (µg/L)
Atrazine	4	0.29 (0.08 – 0.37)	3 (MCL) ¹
Bentazon	1	0.86	200 (HAL) ²
Bromacil	3	0.71 (0.06 – 0.77)	90 (HAL)
DCPA (Dacthal)	1	0.08	70 (HAL)
Deisopropyl Atrazine	2	0.02 (0.04 – 0.06)	....³
Desethyl Atrazine	5	1.94 (0.06 – 2.0)	....³
Dinoseb	1	0.05	7 (MCL)
Metribuzin	3	0 (0.05 – 0.05)	200 (HAL)
Tebuthiuron	1	0.08	500 (HAL)

¹MCL – EPA Maximum Contaminant Level.

²HAL – EPA Lifetime Health Advisory.

³Breakdown product of Atrazine. No reference point available, MCL for Atrazine of 3 µg/L is used.

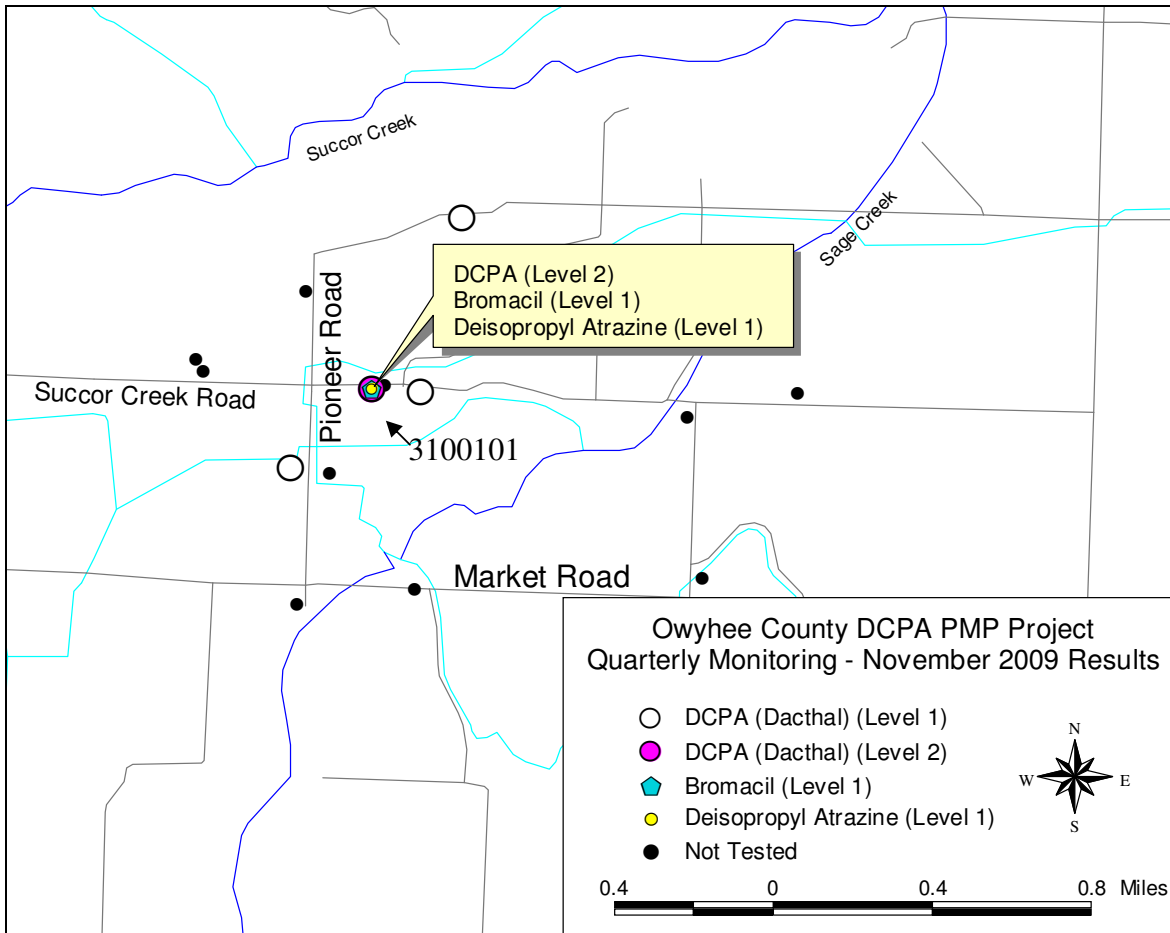


Figure 32. 2009/2010 Discretionary Project quarterly monitoring results (1st round) from Owyhee County DCPA PMP Project.

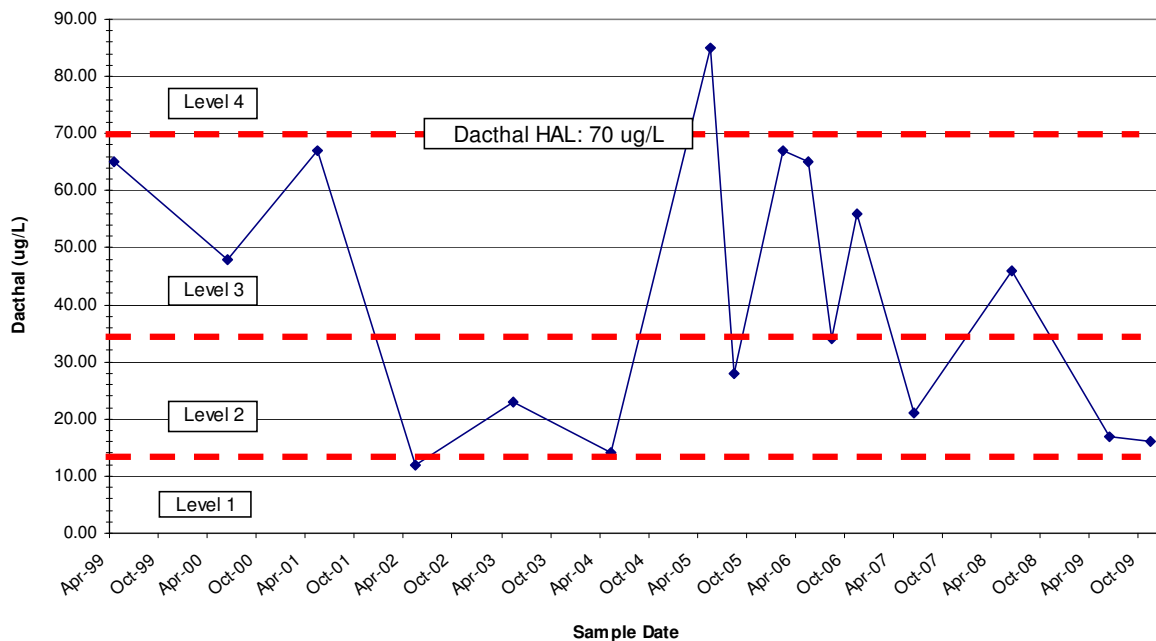


Figure 33. Time-series plot of atrazine concentrations detected in well 3100101.

Table 32. 2009/2010 Quarterly Monitoring Discretionary Project Results from the November (1st round) Monitoring of Select Wells in the Owyhee County DCPA PMP Project.

Pesticide	No. of Detections (4 wells)	Range (µg/L) (Min. – Max.)	Reference Point (µg/L)
Bromacil	1	0.06	90 (HAL) ¹
DCPA (Dacthal)	4	15.96 (0.04 – 16)	70 (HAL)
Deisopropyl Atrazine	1	0.03	....²

¹HAL – EPA Lifetime Health Advisory.

²Breakdown product of Atrazine. No reference point available, MCL for Atrazine of 3 µg/L is used.

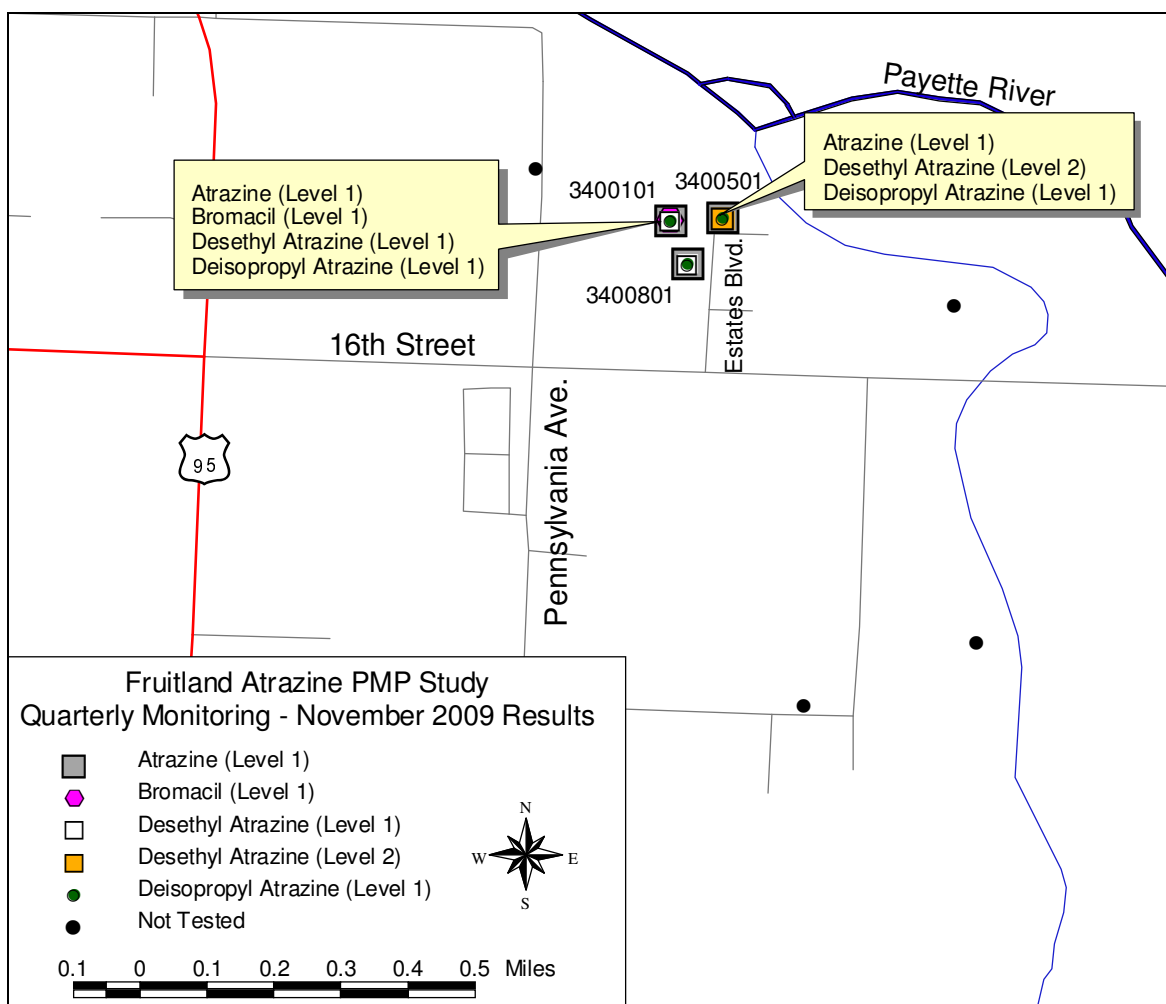


Figure 34. 2009/2010 Discretionary Project quarterly monitoring results (1st round) from Fruitland Atrazine PMP Project.

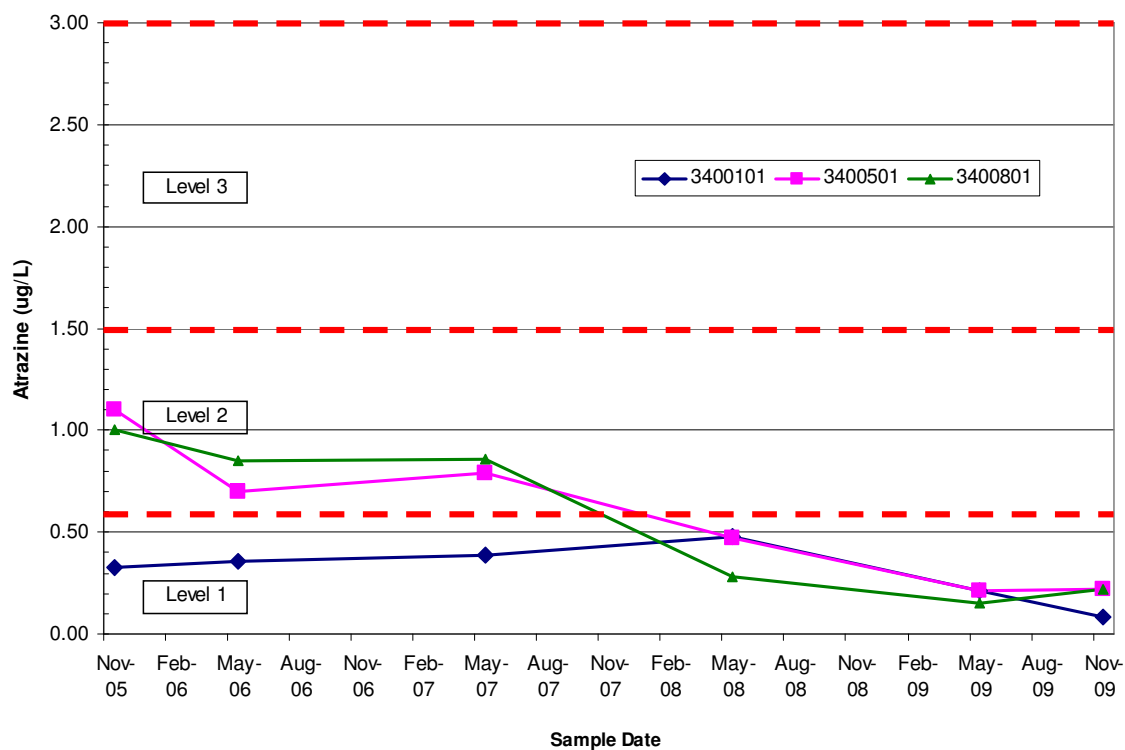


Figure 35. Time-series plot of atrazine concentrations detected in wells 3400101, 3400501, and 3400801.

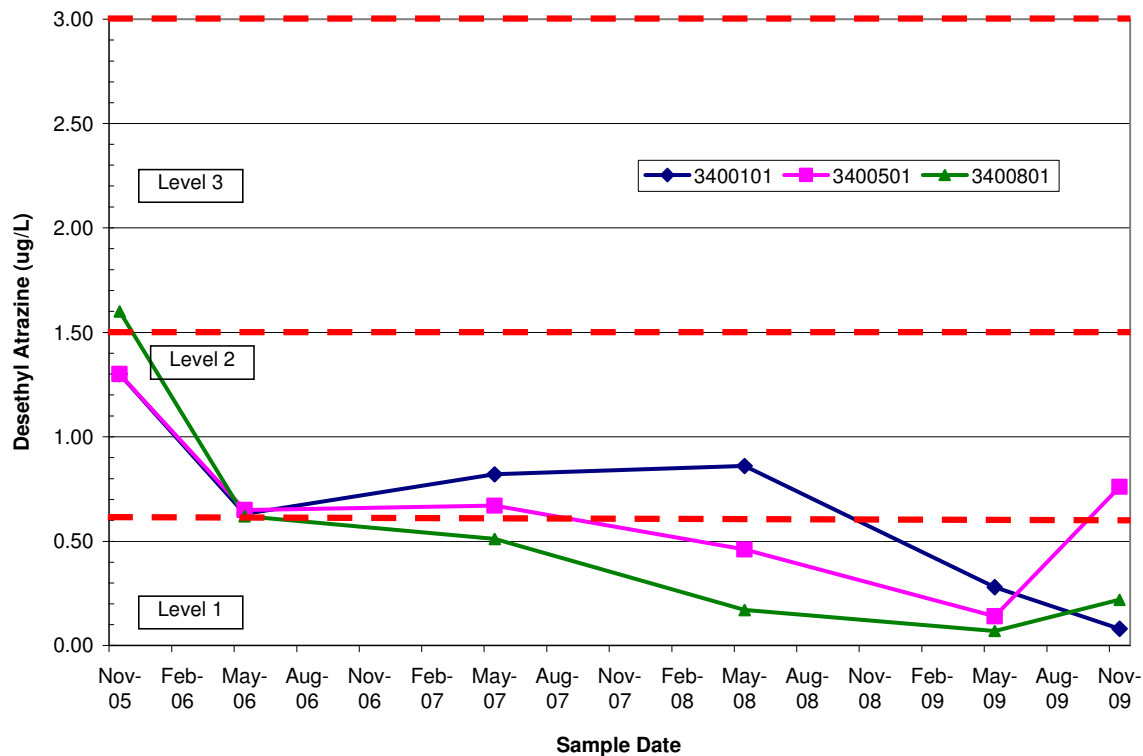


Figure 36. Time-series plot of desethyl atrazine concentrations detected in wells 3400101, 3400501, and 3400801.

Table 33. 2009/2010 Quarterly Monitoring Discretionary Project Results from the November (1st round) Monitoring of Select Wells in the Fruitland Atrazine PMP Project.

Pesticide	No. of Detections (3 wells)	Range (µg/L) (Min. – Max.)	Reference Point (µg/L)
Atrazine	3	0.1 (0.12 – 0.22)	3 (MCL) ¹
Bromacil	1	0.09	90 (HAL) ²
Deisopropyl Atrazine	3	0.03 (0.03 – 0.06)	....³
Desethyl Atrazine	3	0.56 (0.2 – 0.76)	....³

¹MCL – EPA Maximum Contaminant Level.

²HAL – EPA Lifetime Health Advisory.

³Breakdown product of Atrazine. No reference point available, MCL for Atrazine of 3 µg/L is used.

Ground Water Quality Protection Activities

ISDA has the authority to implement pesticide programs through Idaho state laws, ISDA rules, and a cooperative working agreement with the Environmental Protection Agency. ISDA investigates and responds to ground water resource contamination from pesticides through the implementation of the Rules Governing Pesticide Management Plans for Ground Water Protection IDAPA 02.03.01 (PMP Rule). ISDA coordinates PMP Rule activities with agencies and industries through the PMP Advisory Committee pursuant to the PMP Rule and the Agricultural Ground Water Quality Coordination Committee.

Through a cooperative working agreement with EPA, ISDA invests grant funds to evaluate pesticides of interest, take actions related to pesticides of concern, and demonstrate progress in reducing or maintaining concentrations below reference points. ISDA implements the Three-Tier Approach as outlined in the EPA guidance:

- Evaluate **Pesticides of Interest** to determine whether a human health or environmental reference point is likely to be approached or exceeded in localized areas, and the pesticide should be elevated to a **Pesticide of Concern**.
- Take actions (actively manage beyond the label) to reduce or prevent contamination from **Pesticides of Concern** over time.
- Demonstrate the progress of the management strategy in reducing or maintaining concentrations below reference points.

ISDA enters its progress on implementing the three-tiered approach into the web-based Pesticide of Interest Tracking System (POINTS).

Pesticides of Interest are those that appear in the appended EPA list and any others identified by ISDA (and their metabolites and/or degradates) as having the potential to occur in ground or surface water at concentrations approaching or exceeding a reference point. While any pesticide could contaminate water due to illegal use or improper disposal, the intent of the pesticide management strategy is to manage non-point contamination from legal use. Pesticides of interest can be identified through existing field water quality data from various sources described in the monitoring section of this plan, environmental fate and effects data, modeling, or other predictive tools.

Pesticides of Concern are those (and their metabolites and/or degradates) that ISDA has identified as likely to approach or exceed a human health or environmental reference point in ground water.

Designation as a pesticide of concern prioritizes that pesticide for management to ensure concentrations are maintained or reduced below the reference point.

ISDA manages pesticides of concern according to the cooperative work plan with EPA. Because these pesticides are likely to approach or exceed a reference point in Idaho, the goal is to manage 100% of them. The ability to actively manage pesticides of concern will depend largely on the resources available.

Demonstrating progress in reducing contamination from pesticides of concern may be the most difficult measure because it largely depends on the availability of monitoring data. Especially for ground water contamination, it may take many years to show that pesticide management actions are working to reduce the contamination. While the goal is again 100% for this measure, it may take many years to show definitive results.

Even in the absence of detections, ISDA conducts prevention through education and promotion of proper use of pesticides according to label instructions. ISDA will work through meetings, training, seminars, workshops, newsletters, mailings and other means to educate and inform agricultural professionals, other agencies, watershed advisory groups, and soil conservation districts related to the ground water program.

ISDA is the lead agency for implementing policy II-B of the Idaho Ground Water Quality Plan, which was specifically written to prevent ground water contamination from agricultural practices. Prevention activities include implementation of the Information and Education (I & E) Strategy, implementation of the Best Management Practices (BMP) Strategy, and implementation of the Regulatory Strategy when pollution sources cannot be controlled by BMPs. ISDA's strategy for implementing I & E includes coordination of the Information and Education Subcommittee of the Agriculture Ground Water Coordination Committee, development and distribution of educational materials, and facilitation of educational workshops.

Ground water quality protection activities in 2009 included: finishing the draft of the overall I & E Statewide Implementation Plan, updating the Idaho Home-A-Syst (HAS) materials, disseminating fact sheets and brochures, promoting HAS through workshops and participating in several pesticide recertification workshops and other outreach efforts. The pesticide recertification workshops were designed specifically for pesticide applicators and growers (Table 34). Presented material included: pesticide and nitrate ground water quality data, information on proper safety, storage, and handling of pesticides and fertilizers with respect to domestic wells, best management practices for field use of pesticides and fertilizers, and information on the State Pesticide Management Plan and the recent (pending) DCPA (Dacthal) legislation. ISDA plans on conducting additional workshops in the fall/winter of 2010, with the goal of surpassing the attendance number in 2009.

Table 34. The 2009 pesticide recertification education workshops and outreach efforts.

Pesticides and Water Quality Education - Workshops and Other Outreach Efforts			
Date	Location	Event Name	Attendance
1/15/09	Boise	City of Boise - Pest. Recertification Workshop	33
1/29/09	Caldwell	Western Idaho Ag Show	65
2/3/09	Meridian	UICES Living on the Land (Water Quality)	44
2/26/09	Lewiston	North Idaho Pesticide Training	60
3/28/09	Burley/Rupert	GWQ* Open House (display)	120**
4/4/09	Twin Falls	GWQ* Open House (display)	100**
10/21/09	Boise/ISDA	Integrated Pest Management Workshop	59
11/3/2009	Twin Falls	UI Extension Educators Workshop	30
12/2/2009	Boise	ECA Conference	171
12/11/2009	Caldwell	Pesticide Recertification Workshop	95
12/16/2009	Mt. Home	Pesticide Recertification Workshop	61
Total Attendance for Water Quality Education in 2009			838***

* GWQ = Ground Water Quality

**Estimate. Unable to determine exact number of attendees

***Total based on estimates. Unable to determine exact number of individuals receiving water quality education.

The water program at ISDA has been active in the development of data summaries of monitoring projects and agricultural specific educational materials that are distributed throughout Idaho's agricultural community. Data summaries include information on the quality of ground water and recommendations or BMPs for remediation of contamination concerns identified through the monitoring.

Database

The ISDA Ground Water Program database is used to store all sampling data from ISDA regional, local, and special projects. Projects and data are tracked in the ISDA Ground Water Program database. Information regarding the location of the well, well construction, well owner, and geology are also stored in the database.

The database is used to produce homeowner result letters and well analysis reports. Homeowners that participate in ISDA's ground water monitoring program receive a result letter and well analysis report after data is entered.

ISDA Water Program Website

The ISDA water program maintains a web site for internal and external use to easily access reports, data, and information. The site provides our goals and objections, as well as general water quality information. Project maps, data summaries, and reports are also posted. The site address is: <http://www.agri.idaho.gov/Categories/Environment/water/indexwater.php>

Summary

The ISDA Ground Water Program implemented a wide variety of ground water monitoring projects and protection activities related to agriculture for the state of Idaho in 2009. The monitoring efforts in 2009 focused on areas in the state that have either showed past impacts from pesticides, returning to wells with previous pesticide detections to conduct annual monitoring efforts. ISDA currently has 23 distinct and active ground water projects across the state. Fifteen of these projects were regional monitoring projects, two were local monitoring projects, four were Pesticide Management Plan (PMP) response monitoring projects, and two were an EPA funded discretionary pesticide monitoring project. Water quality and pesticide information was presented at nine educational workshops across the state to help inform the farming community of ground water quality concerns related to pesticides and efforts that can be used to protect overall ground water quality. In addition to the workshops, educational material related to pesticides and water quality was disseminated at two ground water quality open houses.

Results of ground water quality monitoring on a regional scale indicate a number of aquifers across the state have significant nitrate impacts with numerous wells exceeding the EPA MCL of 10 mg/L. Thirty one wells (or 13 %) of the 239 regional wells sampled by the ISDA Ground Water Program in 2009 exceed the EPA MCL for nitrate. Six of the seven regional projects monitored for nitrate in 2009, had mean ground water nitrate concentrations that exceeded the 2 mg/L level (Table 3). Median ground water nitrate concentrations per project equal or exceed the suggested background level of 2 mg/L in five of the seven active regional projects sampled in 2009 (Table 3). The Grand View and Bruneau Areas Regional Study has the highest mean value of 8.4 mg/L (with a median concentration of 2.6 mg/L). Wells located in the Washington and Payette Counties Regional Study have the highest median value of 6.1 mg/L (also had the second highest mean of 8.2 mg/L) (Table 3). The remaining projects have mean concentrations ranging from 1.1 mg/L to 5.74 mg/L and median concentrations ranging from 0.03 mg/L to 5.6 mg/L (Table 3). ISDA nitrate monitoring ceased at the end of June 2009.

Testing of regional, local, and discretionary type projects resulted in detections of pesticides in ground water throughout Idaho (where we have projects). However, most detections are less than 20% of health-based standards. Six wells in 2009 had detections of one or more pesticides that exceeded 20% of a health-based reference point, requiring additional response activities. The pesticides detected over 20% of a health-based reference point were atrazine and desethyl atrazine in Nez Perce County; DCPA (dacthal) in Owyhee County; and triallate in Fremont and Idaho Counties.

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